

The utility of behavioural science in landscape architecture:

investigating the application of environment-behaviour theory and its
research methods to fit the spatial agenda of design.

by

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ABSTRACT

This thesis attempts to address the behavioural science/design 'applicability gap' problem currently concerning professional academics and researchers in landscape architecture and related disciplines. Building on research carried out by others, it attempts to gain further insight into the nature of the problem, how the gap specifically relates to *landscape* design, how it manifests itself in the design process, and how the problem might realistically be addressed.

It is argued that in order to address the gap problem in landscape architecture, it is also necessary to address the wider problem of the lack of communication and understanding between research and design spheres. Therefore, the study is conducted from a combined research/design perspective.

A critical review of the literature combined with project driven reflection-in-action analysis establishes a lack of compatibility of environment-behaviour theory, and its research methods, with the landscape designer's spatial approach. It is argued that there is a need for theory-building to facilitate the practical application of *integrated* spatial-behaviour analysis. As a result, a framework of spatial/behavioural compatible theories and concepts, and a set of practical tools and techniques, are conceptualised, and their application explored, for site survey analysis. The utility of the approach is demonstrated for embodying user needs evaluation within the design process and for providing a method for contextualising research. Finally, a shift in thinking is envisaged in which research and design approaches are reconciled.

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"The moment that one asks the question "But, what if...?" and finds that there is no answer, one has a problem area."¹

Background to the Problem

This study began with a simple observation on the working practices of landscape designers: the specific and conscious use of environment-behaviour observations, both in professional practice and in education, did not appear to feature greatly in design thinking. Furthermore, predictions made by designers about the expected human use of their design proposals seemed largely based on conjecture, even though behavioural 'evidence' is available - *if* one looks for it.

On subsequent investigation it transpired that the lack of application of behavioural science knowledge in mainstream design is a recognised problem in the sphere of research. Here, the problem is considered a lack of social responsiveness in design, it is a current cause of concern to environmental design researchers and professional academics where it is described as the 'applicability gap' problem.

Approach

The gap problem is explored through a literature review, observation, reflection-in-action, and some project case study analysis. Visual-spatial analysis plays a significant role in exploring the issues.

Case study examples are used as 'contexts' within which the gap is explored - both from a research perspective, and in the context of the design process. In this way, design-relevant behavioural science knowledge is identified, the gap problem is re-conceptualised in terms that relate to designerly ways of 'thinking' and 'doing', and

¹ STRAUSS, Anselm, CORBIN, Juliet, Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory. 2nd Ed, Sage Publications Inc, USA, 1998, p38

finally, ways in which environment-behaviour theory, and its research methods, might be applied to fit the spatial agenda of landscape architects, are explored.

Research outcomes

The thesis conceptualises a theoretical framework to facilitate a spatial/behavioural approach to landscape analysis. A complementary set of practical tools and techniques are identified and the principles and procedures for their application in design *or* research studies are described. Finally, a generalised methodology is conceptualised for reconciling research and design approaches.

The thesis structure

The thesis is divided into two parts. Part one explores the theory, whilst part two explores its application. The thesis as a whole is set within the context of contemporary thinking in landscape design and the social context of the time in Britain, in which the use of public space, the public perception of ‘the landscape’ and the role of the landscape architect in interpreting and representing it, provide topical debates in design discourse. This is also a context in which recreation and leisure based activities predominate in open space settings where they provide a significant driving force in planning directions.

Whereas the chapters in the first section provide a theoretical exploration, the chapters in the second section explore the practical implementation of the theory it generates - ‘in action’.

The thesis is summarised as follows:

PART ONE: THEORY

Five chapters explore the gap problem and the potential means of bridging it.

Chapter 1: Problem Statement

‘The problem’ is analysed and its scope defined. A critical review of the literature identifies that a number of attempts have been made over the last 30 years or so to explain the gap and address the problem. The need for further investigation is established.

Chapter 2: The Limitations of the theory

In this chapter, the nature of design theory is examined in some detail. The extent to which the theory has historically provided a socio-behavioural perspective is outlined, and the limitations of the theory identified. In this way, further aspects and dimensions of the gap problem are clarified. The exploration establishes the emergence of a body of theory which explains the landscape based on its experiential qualities.

Chapter 3: The Potential of the theory

The experiential paradigm is explored as a potential area for generating theory towards bridging the behavioural science/design gap. The need for theory building to facilitate ‘a new kind of knowing’ is identified.

Chapter 4: Theory Building

In this chapter, six core ‘experiential’ theories and concepts theories are highlighted as having a useful role in ordering, explaining and predicting the human experience of place. Some theory development takes place in the positivist approach to explore and identify ways of utilizing the theory in the design process. In particular, ways in which the theory might be used to embody user needs evaluation *within* the visual-spatial approach, are examined. The chapter concludes by summarising a facilitating conceptual framework for an approach to landscape design *with the user in mind*.

Chapter 5: The Utility of Behavioural Science in Design

In this chapter, the behavioural concepts embodied in environment-behaviour theory will be identified and their design relevance, and compatibility with, the landscape architect’s visual-spatial approach critically reviewed. The most useful concepts for application during the design process are highlighted.

PART TWO: APPLICATION

Five chapters focus on the potential application of integrated spatial-behavioural analysis to the real world situation.

Chapter 6: A tool in the making

This chapter explores the application of behaviour setting theory when embodied in spatial analysis. The application of the theory is explored in research and design-

oriented studies, with particular consideration given to its practical implementation, and its interpretive/predictive capabilities.

Chapter 7: Strategies for predictive thinking

This chapter reviews three ways of introducing predictive thinking to landscape design and discusses their potential to help designers ‘know more in order to understand’ in the context of wayfinding design.

Chapter 8: The applicability of research methodology to design

In this chapter, design and research methodological approaches, and the different contexts each provide, are compared and contrasted. Useful procedures and concepts are identified for application during site survey analysis for improved information gathering for knowledge generation and integration purposes, in research *and* design studies.

Chapter 9: Towards a site survey method

With a view to reconciling research and design approaches, a reflective/interpretive approach is described for application as a site survey method.

Chapter 10: Towards a shift in thinking

This final chapter presents a concluding discussion. The research is summarised, the main contribution to knowledge and understanding is highlighted, and some suggestions are made for future work.

PART ONE: THEORY

“Our theory must be oriented within the social, as well as the technical and aesthetic, potential of the times, if it is to be relevant to the artist as producer and the people as consumers.”¹

¹ ECKBO, Garrett, ‘Landscape For Living (1950)’ in: SWAFFIELD, S, (Ed) Theory in Landscape Architecture. A Reader, University of Pennsylvania Press, USA, 2002, p 11

Chapter 1:

PROBLEM STATEMENT

1.1 INTRODUCTION

In this chapter 'the problem' is investigated and its scope defined. A literature review identifies a number of attempts made over the last 30 years or so to address the behavioural/science applicability gap problem suggesting various theoretical and practical solutions. These are critically reviewed, differing aspects of the general gap problem are identified, and the need for further theoretical and practical investigation is established.

The problem investigated is multi-faceted and embedded within a nest of other problems. This is problematic in itself, and therefore the thesis begins by 'unpacking' the layers.

1.2 SCOPING THE PROBLEM

The applicability gap problem as it relates to the environmental design disciplines, refers to the lack of application of scientific knowledge in design and refers to both social and environmental knowledge. The gap derives from a generic problem that was originally described by writers such as Edgar Schein, Nathan Glazer and Herbert Simon as a gap between professional knowledge and the demands of real-world practice. This was subsequently explored by Donald Schön in his seminal work 'The Reflective Practitioner'¹ and further investigated in 'Educating the Reflective Practitioner'.²

Schön explored the applicability gap as an epistemological problem. He states that the gap lies in the difference between the researchers' and practitioners' *ways of knowing* and identifies the problem solving process as a central aspect of the wider gap problem.

¹ SCHÖN, Donald, A, *The Reflective Practitioner: How Professionals Think in Action*. Temple Smith, London, 1983

² SCHÖN, Donald, A, *Educating the reflective practitioner : toward a new design for teaching and learning in the professions*. Jossey-Bass, San Francisco, 1987

Schön describes how the research approach traditionally operates in a 'scientific' structured way, offering and applying knowledge to resolve an identified problem. In research, Schön states, 'the problem' is selected and defined from the outset, whereas in the practitioner's field, the process of defining the problem is inseparable from solution finding. As a consequence, in real world practice it is difficult for the practitioner to find a *fit* between the given technical solutions (as provided by researchers) and the problems that actually arise, *in the way that they arise*.

The knowledge used by practitioners to deal with problems arising draws on 'tacit' knowledge. This is defined by Schön as that which a practitioner 'knows' is relevant to the problem in hand through reasoned judgement based on experience. It is the act of 'problem setting' itself that enables practitioners to draw on this knowledge and apply it in an 'unconscious' way. This is, apparently, quite different to the type of thinking that is applied in the research world. Essentially, Schön states, the researcher's world of practice does not relate to the 'messy', complex, uncertain and unstable environment of real world practice. The environmental design disciplines practise in such a world.

The design approach

Those who study the design process value 'designerly ways of knowing'³. However, at the same time, it is recognised that design thinking has its limitations because of the nature of design knowledge. In the environmental design disciplines design theory exists in a body of core knowledge of a type that does not characteristically rely on empirical findings⁴. Sancar and Studer summarise the core knowledge of design as 'a repertoire of precedents' providing an 'archive of form-images captured in the norms of an aesthetic style'⁵.

Other studies of the design approach explore it 'in action'. These studies of the design process have found that the designer cannot apply knowledge in the absence of initial 'solutions'^{6, 7, 8}. The act of giving form and structure to a design idea is central to the creative process. Consequently, Sancar states, theories and concepts which are not 'form' related are difficult for designers to utilise in their design process. However, the

³ CROSS N, 'Designerly Ways of Knowing, Design Studies vol 3, no 4, 1982, pp 221-227

⁴ SANCAR, Dr F H, and STUDER, Dr R G, "How knowledge is produced for design", *Environments by DESIGN*, vol 2, number 1, Winter 1997/1998, pp 29-54

⁵ *ibid*

⁶ *loc cit*, SANCAR, Dr F H and STUDER, Dr R G, 1997/8

⁷ *loc cit*, CROSS, N, 1982

⁸ ARCHER, B in CROSS, Nigel (Ed), *Developments in Design Methodology*. John Wiley & Sons Ltd, UK, 1984

act of giving form is not in itself 'design' since this activity may simply involve the copying of a 'model'⁹. Luckman gives the example of a dress-maker making up a garment to a pre-designed pattern, stating that in such a case there is no actual 'design' taking place. Similarly, Sancar refers to an approach in the environmental design area originally termed 'typologic' by Broadbent. This approach is one which encourages the repetition of formulaic approaches to design using established form-types such as 'shopping mall', 'community park' and so on and although the use of these 'prototypes' might still entail 'design', the problem is, such approaches do not encourage the search for, and use of, new information.¹⁰

Regardless of individual approaches to design, the *creative* act of design cannot occur without giving form, or 'form-image', to an idea. Sancar states that this is because the form-giving act itself provides an 'ordering principle' for information acquisition¹¹: it determines the subsequent information sought which in turn influences new knowledge generated. In the design studio situation, 'new knowledge' essentially comprises the innovative design idea (or ideas) which evolve into design solutions. The problem is that this 'art of practice' (to paraphrase Schön) operates in a quite different paradigm of thinking to the 'art of research'.

Sancar has examined the behavioural science/ design applicability gap problem as it specifically relates to landscape design. She used a class of landscape architecture students to study the problems of application of socio-behavioural knowledge in the design studio. This was a unique study - one that specifically explored the behavioural science/landscape design gap problem as it occurs 'in action' in the design process. This study was the only one of its kind (in landscape architecture) that a literature review was able to identify. Therefore the Sancar study and her related work provides a key source of knowledge and insights into the nature of the gap problem as it occurs in landscape design.

Sancar made a significant finding in her study. She found a correlation between those students who were best able to integrate behavioural knowledge in their design process with those who had received a special lecture on the relationship between spatial form

⁹ loc cit, CROSS, N, 1984

¹⁰ SANCAR, Fahriye Hazer, "Behavioural knowledge integration in the design studio: an experimental evaluation of three strategies", *Design Studies*, Vol 17, Issue 2, April 1996, pp 111-219

¹¹ *ibid*

and behavioural theory. The lecture was given prior to the hand-out of a design project which was part of the research study. The lecture given to the students stressed how the spatial form of 'style' precedents such as 'Persian Garden' could be considered in terms of a functional response to the human needs of the time. When these students' design responses were compared with two other groups of students who had not received this 'spatial/behavioural' lecture, distinct differences were found in the way these students made design decisions.

Plate 1.2 summarises three generic types of approaches to design which were adopted by the students, in response to three different types of information submitted at the project hand-out. One group of students was given socio-behavioural information in the form of a list of 'performance specifications' only. These students struggled to incorporate behavioural considerations into their design process, tending towards a 'list' of goals at design inception (**plate 1.2** group A). This contrasted with the group who had had the lecture which emphasised the 'spatial/behavioural' link in design. These students embodied behavioural considerations in the 'form-giving', creative act of design from the very beginning (**plate 1.2** group C).

There was a third group of students (**plate 1.2** group B) who were given socio-behavioural knowledge in the form of both a specification list and a lecture, but this time there was no specific emphasis given to the spatial/behavioural theoretical link in the lecture as per group C. These students (group B) too struggled to infuse the spatial form-giving aspect of the design process with behavioural considerations. This group tended towards bubble diagrams to 'zone' areas of human use rather than build these ideas into the form-giving aspect of design.

In Sancar's study, the critical factor for successful integration of behavioural science knowledge in design was not the provision of behavioural knowledge per se, but the form within which it was given to the students. As a consequence of the study, Sancar suggested a key causative factor of the gap problem is where knowledge is provided *by* researchers *for* designers in the form of performance specifications and 'measures'. This, Sancar states, engenders a design response to user needs in the form of a list of performance 'goals' in the design programme or brief, encouraging 'slogan responses' in design.

The problem with the *list* approach is that it over emphasizes front-end analysis which generally results in solutions lacking in originality:

"a lack of continuity between the problem analysis and generation of form, and the final solution does not reflect the integration of information necessary to respond adequately to the complexity of the problem situation."¹²

Problem situations in landscape design occur in response to highly site specific conditions. This concurs with Schön's description of professional working practice in general. However, the situational response is a key feature of design in the working practices of landscape architects. As highlighted by Christophe Girod¹³, as compared with the architect who does not have to conceptualise what a building is for each new project (except insofar as what the design response is to be) the landscape architect must bring the landscape into perception first, before it can even be dealt with. In other words, 'the landscape' must be interpreted and given form, substance and identity by the designer, before (or at the same time as) ideas for design are developed. Therefore, unlike the architect, the landscape architect has an added 'layer' of analysis at the early stages of the design process at design inception. This, the thesis argues, compounds the gap problem as it occurs between research and landscape design, but it also gives it a specific identity.

Whereas landscape designers are concerned with the particulars of each situation when information gathering during site analysis and the early stages of design, researchers are concerned with the making of universal laws and on "measurable aspects of the phenomena, rather than those less easily quantified."¹⁴ Because of this scientific bias, the argument as presented by Sancar suggests that knowledge generation precludes subjective, place specific and contextual 'information', it impacts on the type of knowledge generated which tends towards information in the form of specifications in list form and these in turn appear non-design relevant to designers who are then, it appears, unable to integrate such knowledge into their design process.

A fundamental difference between the 'scientific' research approach and the design approach might be summed up as the difference between a concern with how things *are* ('science') and a concern with how things *could* be (design). Although writing with

¹² loc cit, SANCAR, F H, 1996, p 135

¹³ GIROT, Christophe, "Towards a general theory of landscape", *Topos*, no 28, September 1999, pp 33-41

¹⁴ loc cit, SANCAR, F H, 1996, p 133

reference to architectural theory, Hillier¹⁵ identifies a weakness in the theory that is as relevant to landscape architecture. Firstly, design theory is weakly analytic in that there is too much emphasis on how buildings and environments should be, and secondly, because of a dependency on normative theory (that is, the advocacies of different designers or schools of thought), there is too little concern with how buildings/environments *actually are*. The consequence of this is a lack of advancement in understanding to help the 'internal' development of the discipline. Because architecture (and landscape architecture) theory is both analytic and normative, it can be innovative and experimental, but it can also be wrong¹⁶.

All of the issues outlined so far describe the general nature of the wider gap problem together with some of the more specific aspects which relate to the behavioural science/landscape design gap. However, what 'needs' to be done to address the problem as it relates to the behavioural science/landscape design gap remains unclear, suffice to say that socio-behavioural knowledge must be transformed into a usable form for design, which in landscape architecture appears to entail the linking of behavioural theory with spatial thinking in the practical process of giving form to the landscape. Therefore, the current investigation cannot begin without further analysis of 'the problem', to explore the efforts made by others to address the gap problem, and to identify the known difficulties and issues arising.

1.3 PROBLEM ANALYSIS

Previous efforts made to address the applicability gap problem have had to deal with the fact that the gap is multi-faceted. These 'facets' may be considered three distinct, but overlapping, 'problem areas': firstly, environment-behaviour research, as embodied within the environmental design research 'community', is a multi-disciplinary area of research activity; the second problem aspect lies in the area of environment-behaviour research methods and finally, there is a problem relating to differing paradigms of thinking in 'design' and 'research' spheres:

1.3.1 Environment-behaviour research: a multi-disciplinary perspective

It appears that the *generic* causes of the wider gap problem are better understood than the nature of the gap as it occurs within the individual design disciplines. This is a

¹⁵ HILLIER, Bill, Space is the machine: a configurational theory of architecture. Cambridge University Press, 1996

¹⁶ *ibid*

likely consequence of the multi-disciplinary perspective of the environmental design research community. The common concerns of such researchers are essentially people-centred issues and cover environment-behaviour research, community consultation, perception, and interpretation. To such researchers, the applicability gap problem provides a generic cross-disciplinary explanation for the lack of responsiveness to user needs by mainstream designers.

The gap problem is predominantly a concern of those operating in a research sphere, outside mainstream design and not all researchers examining environmental design issues have a design background. Environmental design researchers can be grouped into two areas. Firstly in the social sciences there are psychologists, sociologists, geographers and anthropologists, and secondly there are those who research in the design fields, such as architects, landscape architects, urban designers, regional planners and interior designers. Such individuals comprise a variety of researchers that come together under the umbrella term of ‘environmental design research’ and these professionals are mostly researchers affiliated to bodies such as EDRA (The Environmental Design Research Association) and IAPS (The International Association for People-Environment Studies). These organisations are cross-disciplinary in character since ‘environmental design’ is not a discipline in itself, but an area of study which attracts a variety of researchers from many different fields.

Another cross-disciplinary explanation for the wider gap problem is the ‘user-needs gap’ that was originally conceptualised by Zeisel in his ‘user-needs gap model’¹⁷ (figure 1.3.1.i).

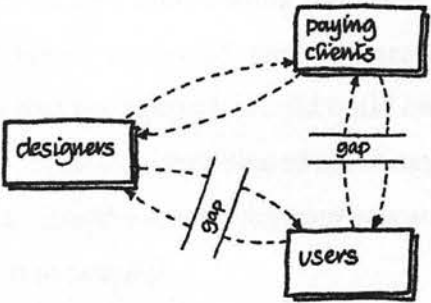


Figure 1.3.1.i – The ‘User-Needs Gap’ model
(LAWSON, Bryan, 1999, p 86)

¹⁷ ZEISEL, John, *Inquiry by Design. Tools for Environment-Behavior Research*. Wadsworth, Cambridge University Press, 1984, UK, USA, Australia.

This was a gap that was seen to occur in design practices whereby paymaster clients and designers communicate freely with each other, but fail to involve the user in the communication process. As a result, in environmental design various procedures and approaches such as community consultation and Post-Occupancy Evaluation have been developed to try and close the gap between designers' perceptions of what the user needs are, and what the user needs *actually* are.

As regards community consultation and Post-Occupancy Evaluation ("POE"), over a number of years they have evolved into disciplinary areas of their own. With regards to POE in particular, the research emphasis has been oriented towards what the user needs are and thus what the designer needs *to do*, whereas research which is oriented towards what the *designer needs are*, in particular the landscape architect, appears to remain largely unaddressed. Furthermore, because of the nature of research in general, there is an implicit requirement towards the transferability of approaches, methods and techniques across disciplines.

In the research community there are established criteria for what constitutes 'good' research and these encourage a cross-disciplinary perspective. John Zeisel describes research quality as 'the degree to which the research can be shared, used and improved upon by other people'¹⁸. He sets out three pre-requisites of 'good' research as: a) inter-subjectivity, b) reliability and c) validity. The first category 'inter-subjectivity' refers to the methodology. Zeisel stresses that the requirement of consistency of methods with accepted theory is necessary in order that 'reliability' and 'validity' may subsequently ensue. This means the method must have been tested elsewhere, and that data is produced which is comparable with others using the same method. Although Zeisel does stress that different combinations of methods are expected to produce new findings, the requirement is that the research should build on a shared 'memory' among researchers. This, Zeisel states, comprises a shared set of categories for both structuring research and recording data. Environment-behaviour research methods have generally emerged out of this approach to research.

¹⁸ op cit, ZEISEL, 1984

1.3.2 The use of Environment-behaviour research methods for design

Post Occupancy Evaluation introduced an evaluative paradigm to environmental design. This is one in which environment-behaviour research methods are applied. POE was introduced in Britain during the 1960s initially to provide a systematic evaluation of a designed, built and occupied setting from the perspective of those who use it.¹⁹ It was initially applied in housing schemes where this type of evaluation was expected to address the user needs gap problem.

POE was intended to provide a feedback mechanism using methods such as questionnaires and environment-behaviour observations to evaluate the degree to which occupied environments met user needs as compared with what the design was intended to achieve. Although POE focuses on gaining insights into the consequences of past design decisions and the resulting building [or outdoor space] performance with *an intention* of providing a feedback mechanism, POE has effectively developed into a discipline area of its own.

POE operates outside mainstream design, functioning as a distinct and separate activity. It is a multi-disciplinary research process and it provides a multi-disciplinary theoretical perspective using an evaluative approach by which different environment-settings may be assessed. For example, in Churchman and Ginosar's paper on post occupancy evaluation of neighbourhoods²⁰, they developed a theoretical perspective for evaluating neighbourhoods, but this did not incorporate design theory. In this instance, the theoretical framework was predominantly rooted in human ecology and environmental psychology and it provided a background framework for individual design disciplines to adapt for application in their own way. Thus the design perspective in this type of research is expected to be provided by the designers themselves.

The original intention behind POE was that the findings were expected to feed back into mainstream design through dissemination in journals. But, as Cooper-Marcus/Francis point out, the results of POE studies that could benefit the design community are now usually conducted by researchers and published in academic journals which designers

¹⁹ COOPER-MARCUS Clare, and FRANCIS, Carolyn (eds), *People Places*. 2nd Ed, John Wiley & Sons, Inc, USA and Canada, 1998

²⁰ CHURCHMAN, Arza and GINOSAR, Oded, "A theoretical basis for the post-occupancy evaluation of neighbourhoods", *Journal of Environmental Psychology*, vol 19, pp267-276, 1999

do not read. However, at least in architecture, the situation is said to be improving where the publication of post-occupancy evaluation research is slowly gaining exposure in progressive design journals: it is now, it seems, becoming more usefully considered as a form of critique.²¹ However, POE remains essentially a research-based activity, adopting an approach which uses questionnaires, surveys, observations and physical measurements, with an intention outwith the design process.

There are certain key texts in landscape architecture that have made a socio-behavioural impression on design thinking. For example, in his seminal book 'Life Between Buildings', Jan Gehl²² made significant progress in helping designers conceptualise *social* space in the physical (urban) environment, and utilise relevant knowledge from the research sphere. One contribution from Gehl in particular stands out, where he identifies an environment-behaviour phenomenon which describes the human preference towards edges of certain street spaces. This is 'the edge effect'.

The edge effect essentially 'translated' a psycho-evolutionary theory on environmental preference, into a design concept for the urban landscape designer. The original theory is termed 'prospect-refuge' by Jay Appleton. The edge effect (according to Gehl) indicates that recesses, doorways, interesting shop fronts and generally 'design rich' edges, provide environments conducive to 'prospect-refuge' and therefore encourage the human activity of 'spending time' in outdoor spaces.

The 'edge effect', as an environment-behavioural *phenomenon*, immediately conjures up form-images in the mind's eye. It provides the designer with a means of conceptualising the *social* environment and, significantly, of introducing some kind of 'measure' of design quality. This is an example of how socio-behavioural knowledge can be effectively transformed for use in design. Gehl also presented a number of other 'social measures' such as visual distances and house front arrangements which encourage social contact. Essentially, Gehl attempted to illustrate how a 'sensory' social environment can be created through design, highlighting the relevance of social measures to designing for human comfort needs. Most significantly, Gehl's work demonstrated that a particular type of human use of a place, that is, one where people

²¹ (According to Magda Sibley, University of Liverpool, Director of the BA Architecture Undergraduate course, speaking at Edinburgh College of Art, 2003)

²² GEHL, Jan, *Life Between Buildings. Using Public Space*. Van Nostrand Reinhold Company, New York, 1987

are spending time engaged in multiple ‘optional’ activities, can be used as a ‘social indicator’ of quality in the physical environment.

In his studies of New York spaces^{23, 24} Whyte, like Gehl, also identified some basic environment-behaviour phenomena which could be used as social ‘indicators’ for environmental quality: for example, the tendency for people to ‘cluster’ at street corners and around shop doorways, indicates a shop doorway located on a corner as an ideal

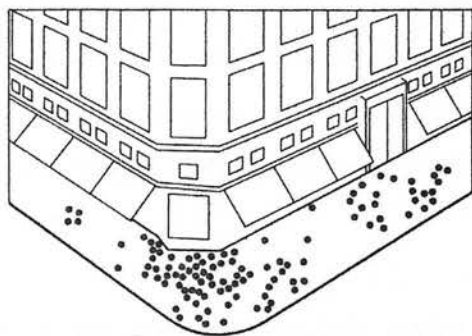


Figure 1.3.2.ii - Street corner and shop doorway ‘clustering’. (WHYTE, William, H, 1988, p 96)

arrangement (figure 1.3.2.ii). However, where there is a lack of space, the positive effect of street corner activity becomes a problem, causing crowding. Another example of the social ‘indicator’ at work can be seen where pedestrians ‘platoon’ along the street when bunching up at pedestrian crossing points in car dominant streets, as compared with ‘free-will’

crossing in pedestrian dominant areas. Such phenomena are observable in any street setting (see figures 1.3.2 iii and iv). In this instance, the forced situation of having to wait for traffic causes crowding through bunching up whereas by free will crossing people find their own space and cross the street at a moment of their own choosing.

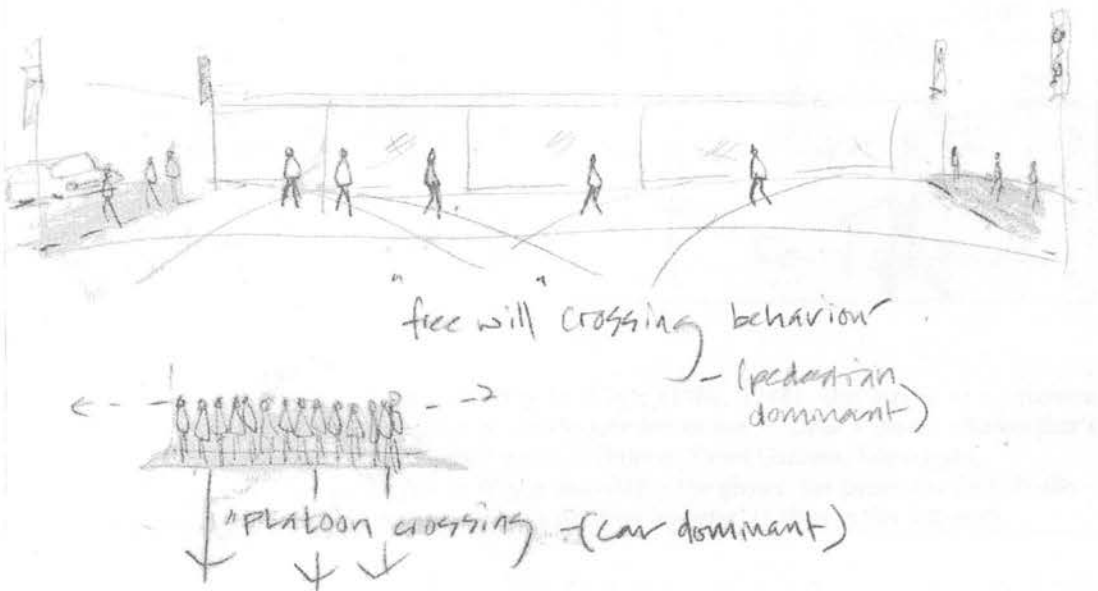


Figure 1.3.2.iii – Two types of street crossing behaviour. (Researcher’s sketchbook)

²³ WHYTE, William, H, City. Rediscovering the Center. Anchor Books, Doubleday, New York, 1988

²⁴ WHYTE, William, H, The Social Life of Small Urban Spaces, Washington D C Conservation Foundation, 1980

Other phenomena identified by Whyte describe how entrance areas and seating places adopt distinct patterns of use according to whether places are busy or quiet. However, Whyte's social observations, in particular ones such as his '100% conversations' which describe the tendency for people to stop in the middle of a busy footpath to talk, rather than move to the side, do not have the same direct visual impact on landscape architectural thinking as Gehl's 'edge effect'. However, one of the most relevant of Whyte's observations identified the importance of transition spaces at entrances – whether to a shop or to park – as 'decision spaces' for facilitating a basic human need to simply have the time and space to make the decision to enter: people can be observed, glancing, pausing and doing 'a foot shuffle', before then entering a shop/park/urban square. Again, these phenomena can be captured in everyday life situations (see figure 1.3.2.iv).

As an environment-behaviour observer Whyte has had a significant influence on American landscape designers, notably Laurie Olin. Olin famously used Whyte's methods and expertise in the Bryant Park design in New York. This project has become the subject of much research and dissemination as a case study analysis – in both research and design oriented publications.

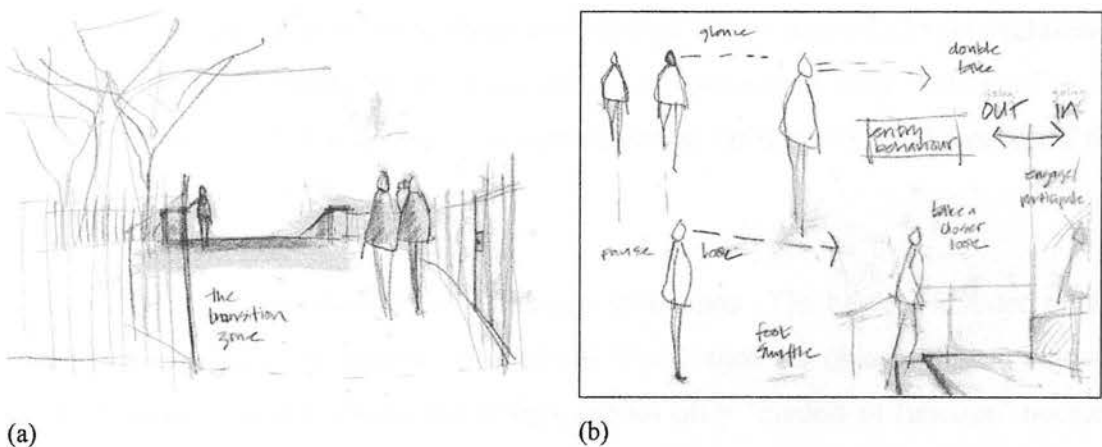


Figure 1.3.2.iv - The transition zone: according to Whyte (1980, 1988) this serves as a 'decision space' which gives the user time and space to decide whether or not to enter a place. (Researcher's sketchbook). (a) A transition zone at a park entrance (Princes Street Gardens, Edinburgh); (b) Typical entry behaviour observed just as Whyte described – the glance, the pause, the foot shuffle – all overt behavioural indicators of a human making a decision 'to enter' (a shop in this instance).

Both Whyte and Gehl's work have had a significant effect on planning directives. Notably, in the former case Whyte developed certain specifications such as seating provision for planning guidelines for New York plaza spaces, and in the latter case

Gehl's work has been instrumental in developing strategies for design and vehicular traffic management in the street spaces of Copenhagen over the last thirty years. However, in both cases, the influence of Gehl and Whyte's work on mainstream design is subject to the limitations of the wider applicability gap problem.

One of the problems in applying environment-behaviour research findings to design, particularly POE style research, is that the design related issues tend to be specific to a particular time and culture. Since landscape design *is* situation specific, POE findings *should* only be relevant to a particular place, time and culture: this implies that the environment-behaviour methods *are* useful to designers even if the findings are not.

Cooper-Marcus and Francis have perhaps made the most comprehensive effort to adapt and apply environment-behaviour research methods to suit the landscape architect. These authors recognise that designers need to balance aesthetics with ecological, contextual and user preference issues, but the problem is, the aesthetic issues are over emphasised. Cooper-Marcus/Francis produced their book 'People Places'²⁵ in recognition of the fact that an approach which uses human behaviour or social activities to inform and shape the designed environment, is not generally the approach adopted by designers, suggesting that to do so would introduce an evaluative approach to landscape design. The authors highlight the problem of design which is based almost exclusively on visual form as leading to the reproduction of previously used 'solutions' or to 'artistic statements' that relate more to current design fashion than to the needs of the public.

'People-Places' is presented as a set of design guidelines. The book is founded on the basis that references to historic 'models of form' such as classic Italian piazzas, although offering useful lessons for design, cannot offer 'models of function' because they belong to another age at a time when public life took place in a quite different cultural setting, and in particular, since this is an American publication, that these models derive from a non- North American setting. The book attempts to provide a comprehensive coverage of all the different types of use that contemporary public space settings should provide for. These are presented using categories of place-types such as 'urban plaza' and 'neighbourhood park' as *settings* for certain types of use. These

²⁵ op cit, COOPER MARCUS Clare, and FRANCIS, Carolyn (eds), 1998.

provide guidelines based on case study examples of user preferences and of how environment-behaviour methods can be applied to identify user needs.

It is not clear what effect the 'People Places' publication and the methods prescribed has and/or is actually having on designers. This thesis acknowledges the book's contribution for drawing together a knowledge base, in particular for its suggested critical, as well as evaluative, framework for design, by which it raises awareness of the need for a change in the basic approach to design. However the book has its limitations. Firstly, the book provides an overwhelming amount of information in the form of data on user behaviour that appear to the reader to be place and culture specific (North American), and much of the photographs appear very dated. Secondly, on the structure of the book itself, although Cooper-Marcus and Francis suggest their place-types should be considered settings of 'use' rather than 'form', by their very descriptions they *are* a set of form prototypes, namely 'urban plazas', 'neighbourhood park', and so on. This does little to reinforce an argument for models of function.

Thirdly, in a final chapter the People Places book prescribes a number of observation based research methods intended for the designer to apply him/herself in the context of POE. But the problem with the use of prescriptive methods, as identified some years earlier by Kevin Lynch and Christopher Alexander and other design theorists, is that designers do not respond well to the idea of prescriptive methods, and the idea of 'methodology'. Rather, according to Lynch, designers need 'techniques' and concepts which they can put together to formulate their own methodology since, in the context of design, the design process *is* the methodology.

There is a third and final aspect of the wider gap problem which may help identify for this thesis what 'needs' to be done.

1.3.3 Research and design paradigms

The gap problem is generally considered in one of two ways within the research sphere. Firstly, there is a view which states that the gap problem is the fault of designers who are failing to utilise behavioural science knowledge in their design process. Another way of considering the problem is to acknowledge that researchers have failed in their task, and that they need to explore alternative approaches to resolve the gap problem. However, as Cairns states, the primary problem is greater than the existence of the

[user-needs] gap itself, for there is a lack of acknowledgement of it by mainstream designers in the first instance.²⁶

One of the key difficulties for researchers is the fact that the non-application of scientific knowledge and non-recognition of the gap problem in design is deeply embedded in design thinking. It is believed that the gap problem lies entrenched in European and North American approaches to design. The traditional Western approach, which was initiated in architecture several centuries ago in Europe, is said to be one that has fostered determinism in design:

"The old idea of architecture as craft and the architect as master builder gave way to the Beaux Arts tradition and romantic ideas about 'creative genius' and high art. This fundamentally western approach has not lent itself well to the detailed consideration of the social and psychological consequences of design decisions."²⁷

Moves against determinism in design in Europe and North America can be traced back long before the idea of 'environmental design research' became established (this was during the 1960s/70s). Around the end of the 19th Century, a duality of interests split between 'social purpose' and 'aesthetic quality'. This was described by Ellin²⁸ as the cause of a divergence into two paths: one took the more abstract aesthetic appreciation of purely formal values in art and the other path took the socially conditioned views, as articulated by John Ruskin and William Morris in England and Lewis Mumford in America. The issue of reconciling aesthetics with social needs was a key feature of such discussions, and formed the basis upon which the subsequent town planning movement emerged. This in turn had a direct influence on the evolution of 'modern' landscape architecture.

Garrett Eckbo, a prominent theorist on emergent 'modern' thinking in landscape architecture in his time, described the problem of reconciling aesthetics with social needs in landscape design theory during the 1950s as a 'dichotomy':

"A good theory of landscape design...must be a theory of form as well as function. It must be artistic as well as practical, in order to produce the maximum for those who will experience work influenced by it. ...We cannot avoid the problem of producing form in the landscape. From the formal western school which went after it with axes and vistas, through the informal eastern school which avoided it with

²⁶ CAIRNS, George, M, "User input to design: confirming the 'user-needs gap' model", *Environments by DESIGN*, vol 1, number 2, November 1996, pp 125-140

²⁷ EDRA 32/2001, Proceedings of the 32nd Annual Conference of the Environmental Design Research Association, 3-6 July 2001 in Edinburgh, Scotland, EDRA, Oklahoma, 2001, p10

²⁸ ELLIN, Nan, *Postmodern Urbanism*, Blackwell Publishers, Cambridge, Massachusetts and London, 1996

poetry, rationalisations, and subjective grotesqueries, to the horticulturists and the naturalists, who bury it in collections or hide it behind nature – all have produced arrangements of cumulative effect, good or bad, on us who experience them, whether or not we know their literary rationalizations. ...Our theory, then, must point the way toward good form in the landscape, but it cannot define it rigidly, on an exclusive, selective basis, with dogma and formulae, rules and regulations, precedents and measured drawings.”²⁹

The ‘dichotomy’ presented by Eckbo has now been replaced by ‘autonomy’ - between research and design. It is a frequently heard complaint that those engaged in environment-behaviour related research feel marginalized by mainstream designers who, not being engaged with, or fluent in the psychological issues surrounding design, are dismissive of the value of the researchers’ work.³⁰ This type of practical research has, over the past three decades developed much knowledge and understanding on the behavioural consequences of design decisions in a wide variety of environment-settings – whether housing, neighbourhoods, street spaces, parks or plazas – and have developed theories that claim to predict and explain the responses of different populations to particular environments.

The journal ‘Environment and Behavior’ provides a formal academic publishing output of experimental and theoretical research work which essentially explores the impact of the physical environment on human behaviour ‘outside’ mainstream design. As a journal oriented towards the researcher, ‘Environment and Behavior’ disseminates a wide range of experimental and theoretical work on issues related to the social environment. Such research is almost exclusively presented in a ‘scientific’ format where problems are framed by a research question and disseminated using a technical research language: this is a type of language that is alien to designers and as a consequence the findings generally remain inaccessible to mainstream designers. The gap problem itself has however more recently been discussed in journals directed towards an inclusive researcher/designer audience, notably the journals ‘Environments by Design’ and ‘Design Studies’. But, there remains a general problem of a lack of communication and understanding between researchers and design professionals. This is referred to as the ‘two communities’ argument.

C.P. Snow was perhaps the first to consider the problem in terms of two communities. In 1959 he published ‘*The Two Cultures*’, a book in which he presented his thesis

²⁹ ECKBO, Garrett, ‘Landscape For Living (1950)’ in SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader*. University of Pennsylvania Press, USA, 2002, pp 10-11

³⁰ loc cit, EDRA 32/2001, Proceedings, 2001

stating that the breakdown of communication between the sciences and the humanities (the 'two cultures' of the title) was a major hindrance to solving the world's problems. Sancar describes the situation as it currently exists between environmental design and research as a 'structural' problem³¹. She highlights the fact that there is a general negative attitude of *designers* towards scientific knowledge which is perpetuated by a lack of common vocabulary, and that this in turn reinforces the gap.

The lack of communication and understanding is highly problematic. James Corner, design theorist and leading figure in contemporary design thinking in mainstream landscape architecture, discounts the value of problem-based practical 'scientific' research and its relevance to the design activity³². However, at the same time he and other writers belonging to the same 'school of thinking' call for more human centred, non deterministic approaches to design. In his anthology 'Recovering Landscape', Corner quotes Augustin Berque's call for a new synthesis of environmental 'facts' and landscape 'sensibilities'. Corner also refers to Christophe Girod's distinction between the 'intuitive' approach to design and the 'empirical' or factual approach. Corner identifies the need for a combined insider/outsider perspective in design approaches, which he states should invoke a 'deeper, socially informed' sense of place'.³³ This is a 'call' that essentially connects with Eckbo's line of thinking from the 1950s. As quoted earlier, Eckbo highlighted the need for theory development towards reconciling the artistic and practical aspects of landscape design.

There is another theoretical stance originally articulated in the behavioural sciences by Constance Perin during the 1960s/70s, with which James Corner's thinking aligns to some degree. Perin pioneered thinking towards an integrated science/design approach. She suggested building a theory towards designing 'with man in mind'³⁴ and her argument, not unlike Corner, was that social science cannot replace intuition - but can enrich it. However, as a scientist she identified that because of a lack of understanding by designers of the scientific approach, there is a 'mutual misapprehension' between designers and scientists:

³¹ loc cit, SANCAR, F H, 1996

³² CORNER, James, (Ed), Recovering Landscape. Essays in Contemporary Landscape Architecture. Princeton Architectural Press, USA, 1999

³³ ibid, p 12

³⁴ PERIN, Constance, With Man in Mind. An interdisciplinary Prospectus for Environmental Design. The MIT Press, USA, 1970.

"What is considered to be "knowledge" or "truth" and what is thought to be the means of achieving it differs considerably between the human sciences and environmental design in terms of a general outlook."³⁵

Also during Perin's era, a variety of pioneering 'designer-researchers' explored different ways of introducing social responses to design. Kevin Lynch, Christopher Alexander, as well as Jan Gehl, were all key investigators in this respect. Notably, Lynch pioneered his perceptual approach to urban landscape planning and design and Alexander developed his pattern analysis approach.

Despite all the efforts made by different researchers at different times it remains the case that, 30 or more years on, to the frustration of environmental design researchers, design theorists and researchers alike are no nearer towards bringing people into design, and designers continue to gain criticism for their inadequate response to user needs.³⁶

Summary - key aspects of 'the problem'

As a consequence of all of the issues outlined above, the applicability gap problem appears to be unyielding. Therefore one must ask *what is 'the problem'?*

The issue of design relevancy of knowledge generated by environment-behaviour researchers is a central aspect of the problem. The epistemological argument is that the *type* of knowledge being generated is inappropriate. Sancar identifies that a key cause of the problem lies in the differences between the information gathering process that occurs in research and that which occurs in design: designers have difficulty incorporating knowledge that is not 'style', or form related to begin with. In design, the initial creative act of form-giving determines the subsequent information gathering process, whereas in a research sphere information gathering is a completely separate and different activity – focussed on 'measuring' and testing within a *scientific* paradigm of thinking

The problem defining process that occurs in practice as described by Schön, is a key characteristic of the designer-practitioner's working approach. This takes place in the context of the design process since problem analysis is intrinsic to design. Inbuilt into this is the process of identifying structural form, and thus bringing the landscape into perception, in order that it can be dealt with. The problem, as highlighted in particular

³⁵ op cit, PERIN, C, 1970 p 6

³⁶ loc cit, EDRA, 2001

by Sancar, is that scientific knowledge, as produced in the research sphere, is not generally in an immediately usable form for design and it needs 'transforming' for use in design as practised today. This in itself, Sancar states, implies that researchers must be asking the wrong questions to start with³⁷.

The multi-disciplinary perspective of the environmental design research community begets a generic approach to the applicability gap problem, generating an understanding of the problem at a wider level, tending to focus on the study of user needs and the development of research rather than design frameworks. Research approaches tend to conform to the convention which states that research methods should be transferable across disciplines and so the usability, and therefore the *usefulness*, of environment-behaviour research methods to designers remains questionable.

The limitations of the 'research into practice' structural arrangement have become apparent. The lack of communication and understanding between the two paradigms of research and design perpetuate autonomy in thinking in the two spheres, this inhibits the process of integrating research based knowledge into design practice, and as a consequence there remains a problem of reconciling aesthetics with social needs in landscape design. This takes 'the problem' full cycle back to the original problem conceptualised by Schön who stated that the practical application of research based knowledge does not actually apply to the real world of practice – one which he describes is characterised by 'unique events', occurring in situations which are uncertain, complex and unstable:

"In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work. He must make sense of an uncertain situation that initially makes no sense."³⁸

1.4 THE NEED FOR INVESTIGATION

In landscape architecture there exists a problematic situation that needs to be 'converted into a problem'. But since researchers' and practitioners' roles are polarised, there is no clearly established context within which to frame the problem to begin with:

³⁷ loc cit, SANCAR, F H, 1996

³⁸ op cit, SCHÖN, Donald, A, 1983, p 40

"When ends are fixed and clear, then the decision to act can present itself as an instrumental problem. But when ends are confused and conflicting, there is as yet no "problem" to solve. A conflict of ends cannot be resolved by the use of techniques derived from applied research. It is rather through the non-technical process of framing the problematic situation that we may organise and clarify both the ends to be achieved and the possible means of achieving them...it is the work of naming and framing that creates the conditions necessary to the exercise of technical expertise."³⁹

This thesis suggests that the behavioural science/design applicability gap problem should be 'named' and 'framed' as it specifically relates to landscape design since 'the problem', as it currently exists, is lacking in definition. As it stands, there are three key explanations for the lack of application of behavioural science knowledge in landscape design which merit investigation: a) a lack of theory building aimed towards reconciling social and aesthetic perspectives in landscape design; b) a lack of design relevant and usable practical 'knowledge' generated by environment-behaviour researchers for landscape architects, and c) a general lack of communication and understanding between research and design spheres. The last issue relates to a fundamental underlying problem which this thesis suggests should be central to any research approach attempting to address the gap problem: this relates to the lack of acknowledgement of the problem, which is likely to remain a problem until designers can 'see' the gap and how it relates to their design process.

To bring the gap problem into design consciousness towards achieving an acknowledgement of its existence, the thesis proposes that behavioural science concepts (as framed by environment behaviour theory) should be explicitly linked to spatial form (as embodied in *landscape* design theory) through some positive theory building. This should aim to generate conceptual bridges to facilitate 'a new kind of knowing', and in so doing, provide a framework within which to place the gap problem. In this way the thesis aims to enhance understanding of the nature of the behavioural science/landscape design gap problem, and the potential means of bridging it through theory building, by articulating the knowledge it generates using a language designers can understand. Given this overall aim, and in consideration of the wider research/design gap problem, an appropriate context within which to frame this investigation must be in a combined research/design paradigm. This necessitates a shift in thinking.

³⁹ op cit, SCHÖN, Donald, A, 1983, p 41-42

Towards a shift in thinking

By re-thinking the gap problem in a combined research/design paradigm, it is argued that the practical needs of both research and design can be considered to ensure that research outcomes are design relevant but at the same time satisfy the requirements and expectations of the research community. The structural problem as articulated by Sancar is that socio-behavioural knowledge needs ‘translating’ into a usable form for design but the problem is, the communication and understanding between research and design is hindered by autonomy between design discourse on the one hand, and research dissemination on the other. Therefore, the thesis proposes that the gap problem should be investigated through some project driven reflection-in-action analysis of the design activity to identify how to ‘design with the user in mind’, on the one hand, and, ‘how to research with the designer in mind’, on the other. This should help identify how existing theory translates into practice (or not), and what new bridging theory might be generated. By approaching the problem from these two perspectives simultaneously ‘the problem’ may be defined and articulated in a way that is meaningful to landscape architecture thinking towards gaining acknowledgement of the gap in design, but at the same time articulate and make explicit the landscape design process to help researchers better understand the needs of designers.

Outcomes

The thesis will aim to provide a groundwork body of facilitating, bridging theory and practical explorations, towards integrated spatial and behavioural thinking and in so doing, bridge the two paradigms of thought between research and design. The integrated spatial-behavioural approach to landscape design will be explored for its potential as ‘a new kind of knowing’ communicable through both verbal (written) and visual language.

The groundwork provided by the thesis will be interpretive, (that is, provide an interpretation of the problem), reflective, (of the design process), and instructive, (of a new kind of knowing). In this way, the thesis aims to play an active role in articulating the behavioural science/landscape design gap problem, and the potential means of addressing it, towards defining the problem in ‘designerly’ terms as a step towards improving understanding and communication between research and design. Thus, the situation might begin to shift from where it currently sits – locked in the research sphere as *the applicability gap problem*, and in the design sphere as a *non-problem*.

Conclusion

There is a need to enhance understanding of the nature of the behavioural science/ landscape design gap problem. ‘The problem’, and the potential means of addressing it, needs to be explored, defined and articulated in terms that are design relevant.

The next chapter presents a critical review of design theory in landscape architecture as a first step towards enhancing understanding of ‘the problem’ towards defining it, and identifying the potential means of addressing it.

Chapter 2:

THE LIMITATIONS OF THE THEORY

“Those constructs unique to environmental design cluster mainly around the formal and aesthetic properties of space, volume, location, and style. These physical characteristics have been assumed to carry meanings for human behavior in the same terms used by the social and behavioral sciences as we know them. Research has shown they may and they may not.”¹

2.1 INTRODUCTION

It has been suggested that the applicability gap problem is linked to a limitation in the theory^{2,3}. The general argument is that design theory in landscape architecture and related disciplines is lacking in scientific foundation and that the core knowledge is predominantly ‘form’ related, deriving from normative theories, design paradigms and ‘style’ precedents. This chapter will explore the basis of this argument through a literature review combined with studio-based observations of landscape architecture students.

The nature of the theory is examined. The chapter explores the type of theory embodied in the discipline, the extent to which the theory has historically provided a socio-behavioural perspective, the way in which design theory becomes established in landscape architecture, and the ways in which the theory, and ‘knowledge’ in general, becomes usable (or not) in practice.

The existence of an ‘experiential paradigm’ in landscape design is identified where various theorists have attempted to conceptualise ‘experiential space’. However, these theories are characterised by ambiguity, contradiction and complexity and present a general lack of clarification in the thinking. The thesis links this to the applicability gap

¹ PERIN, Constance, *With Man in Mind. An interdisciplinary Prospectus for Environmental Design*. The MIT Press, USA, 1970, p 15

² SANCAR, Fahriye Hazer, “Behavioural knowledge integration in the design studio: an experimental evaluation of three strategies”, *Design Studies*, Vol 17, Issue 2, April 1996, pp 111-219

³ op cit, PERIN, Constance, 1970

problem and the chapter concludes by suggesting the potential role of the experiential paradigm for new theory building should be further explored.

2.2 THE KNOWLEDGE BASE – DESIGN THEORY

Design is an intuitive process. But, as indicated earlier, intuition does not operate in a vacuum. This section will begin by identifying the core knowledge base that collectively informs the landscape architect's design process.

Background

Sancar and Studer summarise the core knowledge in the environmental design disciplines as 'a repertoire of precedents' providing an archive of form-images captured in the norms of an aesthetic style⁴. Sancar states that it is the form giving activity which identifies the designer's role and therefore any investigation about integrating science in design, should first and foremost be about design theory.

Whereas theory in the human sciences essentially demands a value-free stance, design theory in landscape architecture and related disciplines is value-laden by default since designing is itself, a 'value-laden commitment'⁵. Values in design derive from the aesthetic, artistic response to place as shaped by the theory of the discipline. Cooper-Marcus/Francis noted a gap in the literature which exists in the area between design texts which are oriented towards the visual approach and texts on the pragmatic aspects of design such as construction details. These authors noted that although there exists a substantial body of work which explores the practical issue of the human use of space and the application of environment-behaviour methods,

"Overall, the books that serve as inspirational and self-defining material for designers of the [urban] environment are theoretical, concerned more with developing universal axioms and meaningful methods for analysing form than with exploring the more concrete issues of casual use of real spaces by ordinary people."⁶

The problem, according to Sancar, is related to how knowledge becomes embodied in design theory.

⁴ SANCAR, Dr F H, and Studer, Dr R G, "How knowledge is produced for design", *Environments by DESIGN*, vol 2, number 1, Winter 1997/1998, pp 29-54

⁵ op cit, PERIN, Constance, 1970

⁶ COOPER MARCUS Clare, and FRANCIS, Carolyn (eds), *People Places*. 2nd Ed, John Wiley & Sons, Inc, USA and Canada, 1998, p 15

Historically, landscape design theory has been structured by adopting and adapting theories made in other distinct but related fields, notably the arts and ecology. However, *Criticism* is playing an increasingly important role in theoretical development in landscape architecture, particularly during the last decade or so. Certain publications which have facilitated this process have emerged, one notable example being James Corner's 'Recovering Landscape'. Also, the emergence of the progressive European landscape design journal 'Topos' has played a key role in circulating ideas and current thinking around the landscape design community in Europe and beyond. The significance of Criticism to theoretical development is best understood in the context of architecture, from where the tradition emerged.

The significance of Criticism

The process of Criticism is difficult to explain in the abstract. Sancar/Studer⁷ suggest that the process is best described by tracing the development of recent theories: for this, postmodernism is selected.

Postmodernism emerged from a broad critique of 'modern' international architecture of the time. As a result of some intense debate, and as globalisation began to take expression in the design world, a new social agenda acknowledging pluralism, uniqueness of place and sustainability, emerged.

Sancar/Studer describe Criticism, in environmental design in general, as both a social and a professional activity. They state that it is a process that begins in design where designers develop theories 'in practice'. As a *social* activity, Criticism provides a structured context for discussing the concerns relating to the built environment and for expressing and sharing formal design experiences and 'scholarly' literature. Out of this process emerges a shared language, and a set of departure points for argument and innovation.

A key characteristic of the postmodern debate was that it acknowledged the use of the critical inquiry. In turn, concepts and theories from the sciences and humanities became criticised, reinterpreted and reincorporated into design as fully-formed design theories. Most notably these were Regionalism, and later Critical Regionalism out of which

⁷ loc cit, SANCAR, Dr F H, and Studer, Dr R G, 1997/1998

regional identity became a topical debate in the environmental design community during the 1990s. This took place formally (professionally) and informally (socially) in the design community.

Regionalism was considered the antidote to ‘universal placelessness’⁸. It was seen to provide a much needed emphasis on place identity and local distinctiveness. Critical Regionalism in particular, provided a *critical* framework for analysing buildings and landscapes, where criteria for quality and design performance could be based on a design’s ability to express local distinctiveness. Such assessments generally took consideration of use of materials, of craftsmanship and of ‘style’.

In landscape architecture Michael Hough, through his examination of ‘the vernacular’ in landscape settings, firmly placed regionalism in landscape design theory.⁹ He explored and illustrated how the differences between one place and other (ie, ‘regional identity’) are the result of a combination of local, natural, cultural, historical and political processes. In so doing, Hough essentially opened up the reader’s mind (the designer) to a broad, interpretive outlook since in order to express local distinctiveness the designer needs to interpret ‘invisible’ forces and translate them into design expression. In the modern context, in a global market economy, expressions of local processes in the form of a new vernacular must occur through a conscious and determined effort on the designer’s part (figure 2.2.i).



Figure 2.2.i – Street pavilion, Sydney. (CLARE, Kerry and Lindsay, 1998, p 55)

As a professional (as opposed to *social*) activity, Criticism is conducted by ‘master-designers’ and critics in the design discipline. According to Sancar/Studer, a theory is established after it has become distilled into ‘form-images’ or a set of rules. It then

⁸ FRAMPTON, Kenneth, in FOSTER, Hal (Ed) “Towards a Critical Regionalism: Six points for an Architecture or Resistance”, The Anti-Aesthetic Essays on Post Modern Culture, Bay Press, Washington, 1991

⁹ HOUGH, M, Out of Place. Yale University Press, New Haven and London, 1990

becomes interpreted and discussed in academia, the theory passes into a new sphere involving the media and non-design academics, eventually resulting in complete 'diffusion' of the original theory in which condition it becomes established in policy and regulation. The problem, as identified by Sancar/Studer, is that the professional activity of Criticism now generally operates autonomously to the social activity of Criticism, and as a result, theory is perpetuated through diffusion rather than innovation, and the activity of Criticism has not provided the self-consciousness in design that it was expected to add.

Criticism, as it *actually* occurs, is generally characterised by design and research autonomy: theories and innovation generated in design either become discussed separately in design discourse or become framed by research questions in a research sphere where the original 'theory' is taken out of context, there is a long time lag between the theories and/or issues entering the research process and their emergence in academic literature, by which time the ideas are obsolete in design terms. Thus, autonomy between 'design' and 'research' negates the whole feedback process that Criticism was intended to achieve, and the abstraction of design theory from design, according to Sancar, leads to lack of innovation in theoretical development.

The development of landscape design theory over its life history has been characterised by episodes of innovation in an otherwise relatively slow evolutionary process of theory shaping. Attempts are continuously made to try to draw together its many strands - a process in which Criticism is only just beginning to play a part.

Landscape design theory

Landscape theory is broad. It draws on concepts which explain the landscape in many different ways. Christopher Girot – a significant contributor to Criticism in the contemporary landscape architecture debate - acknowledges the diversity of the theory of landscape suggesting that it is even contradictory and that "one can deal with it on a variety of human, economic, political and cultural levels."¹⁰ Girot describes the landscape as 'a complex tangle of different human activities'. This description may equally apply to landscape theory which itself may be viewed as an expression of local, natural, cultural, historical and political processes.

¹⁰ GIROT, Christophe, "Towards a general theory of landscape", *Topos* no 28, sept 1999, p 34

In the 1970s Meinig had provided a set of distinct categories by which the landscape may be interpreted. He referred to these as 'ten versions of the same scene'¹¹:

- landscape as Nature
- landscape as Habitat
- landscape as Artifact
- landscape as System
- landscape as Problem
- landscape as Wealth
- landscape as Ideology
- landscape as History
- landscape as Place
- landscape as Aesthetic.

The landscape category that Meinig identifies as occurring at human scale is 'landscape as Place'. When distinguishing 'place' from landscape, Meinig describes them as similar and yet different, stating that place is experiential to a degree the landscape is not. Although, he goes on to say that the way we see landscape depends on our experience and purpose, in our *experience* of place there is an inherent ambiguity. On the one hand there is a general recognition by *public* agreement that certain areas exist as 'places', and on the other hand there exists a sense of place at a *private* level.

Meinig draws on another distinction within his discussion of 'place', between 'environment' and 'landscape'. He states that the two are related, but not identical, that it is the environment which 'envelopes and sustains us', whereas the landscape is less directly a part of our organic being. The landscape is less tangible and definable, and according to Meinig is something we 'define by our vision and interpret with our minds'.

As a point of convergence with other disciplines, 'place' might be considered a more inclusive term than 'landscape'. According to Dovey, any academic study of 'place' also entails a bridging of interest across different paradigms¹², and similarly in this mode of thinking, Meinig notes that landscape as place is the view of the landscape cultivated by travel writers and human geographers and that since all human events 'take place', all problems are anchored here.

¹¹ MEINIG, D W, (Ed), *The interpretation of Ordinary Landscapes*. Geographical Essays, Oxford University Press, USA, 1976

¹² DOVEY, Kim, *Framing Places. Mediating Power in Built Form*. Spon Press, 1999

In his writings which appeared much later on the topic of 'regional identity', Michael Hough also highlighted an ambiguity of place¹³. Hough stated that the understanding of places begins with feelings, but that feelings about places differ depending on whether we are visiting, working or living in them.¹⁴ Hough states that the realisation of a place's 'environmental possibilities' entails an approach in which problems and solutions are identified by understanding the 'reality' of place and that this must occur through analysis of 'its patterns of movement, its social dynamics, its history and traditions'. Hough draws greatly on Patrick Geddes and makes reference to his doctrine that in order to really know a place and to understand it, one must seek out its 'essential character' (on foot) – see figure 2.2.ii.

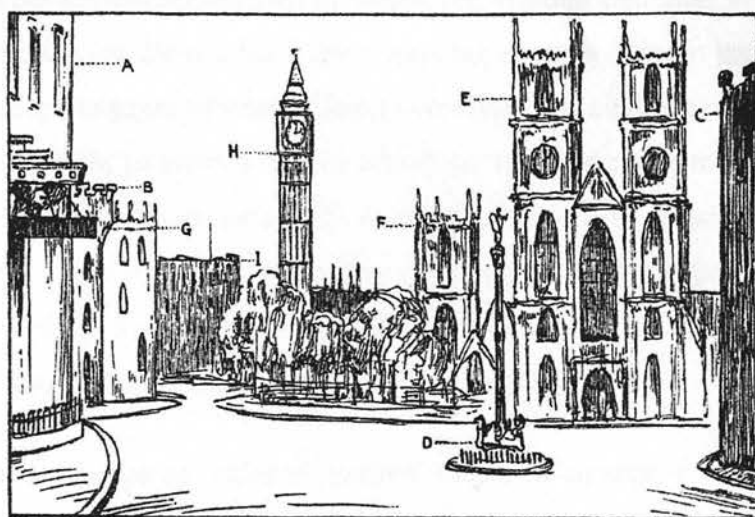


FIG. 5.—PRECINCTS OF THE ABBEY: APPROACH FROM VICTORIA STREET.

A. National Liberal Club. B. Corner of Westminster Hospital. C. Church House and Dean's Yard. D. Westminster School Column. E. The Abbey, West Front. F. St. Margaret's Tower. G. Corner of Middlesex Guildhall. H. Clock Tower. I. Office Buildings.

Figure 2.2.ii – Geddes' approach to seeking out the 'essential character' of a place, on foot. (in WELTER, Volker, M, 2000, p 113)

Treib described the 1960s/70s decades as 'anti-aesthetic'.¹⁵ This was an era which was dominated by attempts to rationalise the practices of architecture and landscape architecture, and which favoured social utility over the pursuit of form and meaning. It was within this context that Meinig conceptualised 'the landscape problem' from two polarised perspectives. Firstly he refers to a problem in the scientific sense of 'a need to know more in order to understand', and on the other hand he distinguishes a way of seeing the landscape problem in terms of a need to 'correct'. As highlighted by

¹³ op cit, HOUGH, M, 1990

¹⁴ ibid

¹⁵ TREIB, Marc, "Must Landscapes Mean?: Approaches to Significance in Recent Landscape Architecture", *Landscape Journal*, Vol 14, Issue no 1, 1995, pp 47-62

Hillier¹⁶, it is the lack of concern by designers on how buildings/environments *actually are*, or to borrow Meinig's words – a lack of 'knowing more in order to understand' – that is inhibitory not only to the individual design process but also theoretical development within the discipline.

In reaction to the 'anti-aesthetic' years, the 1980s saw the emergence of a 'cultural' approach. Initially instigated much earlier by cultural geographers who began to interpret ordinary landscapes by first looking at the world around them, the cultural approach helped synthesise some of the different strands of thinking as presented in Meinig's work.

During the 1970s Meinig highlighted the existence of polar extremes either side of the cultural perspective: on the one hand there were the everyday design professionals who see each landscape in terms of a set of design problems and challenges, and on the other hand those who might be termed 'social actionists' (referring here to Rachael Carson), who saw the landscape in terms of a crisis situation in a state of ecological impoverishment. Ian McHarg was another such extremist of the time who eventually became criticised for his 'eco-fundamentalism' and his view which saw 'nature' (the natural world) as the only viable source of landscape design.¹⁷

As the idea of landscape as 'cultural product' began to emerge in texts in the 1980s, writers such as Denis Cosgrove realised it was the means by which the landscape's inherent ambiguities, its dualities, and 'tensions' could be reconciled. Landscape as 'culture' therefore, it could be said, provided a mediation between the two extremes of 'nature' (or ecology) and 'man' (or psychology). The cultural perspective thus occupied the middle ground area and its conceptualisation now began to take shape in the theory.

Critics of the McHargian ecological approach, such as Laurie Olin, have stated that design decisions normally derive from a far greater complexity of factors than those of ecology and 'reams of analysis and overlays'¹⁸. Also, as Meinig identified, the 'propagandists' and extremists do not represent the everyday design professionals, who are focussed on imagining ways of 'improving' the landscape by more modest means

¹⁶ HILLIER, Bill, *Space is the machine : a configurational theory of architecture*. Cambridge University Press, 1996

¹⁷ loc cit, TREIB, Marc, 1995

¹⁸ ibid

through 'the plot plan' and the sketch.¹⁹ This is the workaday context within which theory becomes practice - or at least it is intended to. As Jon Lang highlights in his discussion on theory development in the environmental design disciplines in general, although designers know much about people and design issues, it is only by recognising the limitations of knowledge within a profession, that one can realise the benefits that could accrue from having a stronger positive theoretical basis.²⁰

Landscape architecture – a design discipline

Currently in landscape architecture there appears to be emerging a focus on the profession as a design discipline. Swaffield recently presented an overview of landscape theory in which he consciously excludes environmental perception and behaviour, and landscape ecology theory. He uses key 'landmarks' in its evolutionary history to 'map' the theory base in its progressive layers. The publication – which he terms 'A Reader' – sets the tone in the first chapter with excerpts from Garrett Eckbo ('Landscape for Living', 1950); J B Jackson ('How to Study Landscape', 1980); James Corner ('Origins of Theory' and 'Theory in Crisis' 1990 and 1991); and finally Elizabeth Meyer ('Situating Modern Landscape Architecture', 1992): in this way the reader is placed from the beginning in the historical/theoretical context out of which contemporary thinking about the nature of the profession as a design discipline evolved.

It is significant that Swaffield's 'reader' opens with an excerpt by Garrett Eckbo. It was Eckbo who, representative of the landscape designers emerging from the 1930s 'modernist' era in America, challenged the European approach which valued 'history' as a precedent of styles and typologies to be applied to contemporary problems and projects.²¹ Eckbo, as a 'new world' landscape architect who was both theorist and designer-practitioner, effectively started with a 'clean slate'. According to Treib²², Eckbo theorised a modern approach to landscape design in which the landscape became configured for *use* rather than based on a set of formal principles. However, when the Jellicoes published 'The Landscape of Man' where they placed landscape design within its entire socio-economic/artistic/philosophical/historical/international context, they

¹⁹ op cit, MEINIG, D W, 1976

²⁰ LANG, Jon, Creating Architectural Theory. The Role of the Behavioural Sciences in Environmental Design. Van Nostrand Reinhold, USA, 1987

²¹ loc cit, TREIB, Marc, 1995

²² ibid

emphasised that “all design derives from impressions of the past, conscious or subconscious”²³.

If the theory emerging from a given era in time is considered an expression of a wide range of global (international) and local (national) evolutionary forces at work, then the knowledge base at the core of British landscape design should be considered as internationally influenced, and yet British at the same time.

In the context of the current thesis, ‘impressions’ of the past are reviewed in terms of ‘key shifts in thinking’ that have occurred in the evolutionary process of theory building in the discipline.

Key shifts in thinking: an evolutionary perspective

Shifts in thinking introduced at different points in history may be identified as new ways of thinking about, conceptualising and representing the landscape that were influential to the evolution of the theory and to designers in practice, at given points in time. Three key influences in landscape design theory can be grouped as:

1. social perspective;
2. concepts of space, and
3. ‘contemporary’ thinking.

It is notable that the last (third) category is essentially a summary of where landscape architecture thinking is at now, and what its main influences are. This contrasts with the first two categories which are discussed in terms of specific influences belonging to an identifiable era in history. However, there is much overlapping and cross-referencing between all three. It is also notable that some of the theories are explored in fine detail: this is considered necessary for the purpose of teasing out the subtleties of the theory which are relevant to the argument in hand – one which states the need to *enhance* understanding of the gap problem, and to ‘name and frame’ the problem as it specifically relates to landscape design.

²³ JELLICOE, Geoffrey and Susan, *The Landscape of Man*. Thames and Hudson, London, 1987, p 7

2.2.1 Design Theory - A Social Perspective

During the late 1960s/1970s, there was a development of socially responsive approaches to environmental planning and design. New theoretical structures emerged from key works such as Kevin Lynch's 'Image of the City' and Christopher Alexander's Pattern Language. These emerged in the midst of the 'ecological' movement which in turn was a response to the realisation that the capacity of the earth was not unlimited²⁴. The ecological perspective provided a framework where all biological things were linked to one another, where the idea of totality, continuity and interdependence of all the parts of the whole became recognised and understood. It was out of this background that pioneering designer-researchers such as Lynch, Alexander and Jan Gehl emerged.

The designer-researchers of the time had to try and reconcile their socio-ecological interests with the aesthetics of design. Lynch, Alexander, and Gehl developed theories using an approach which provided a 'research-into-design' mode of thinking where there was an active and conscious effort to generate new theory which linked socio-behavioural and experiential considerations with 'design'. These key researcher/designers pioneered most of their work in the urban context and this is a factor which this thesis considers highly significant to the theoretical development of landscape architecture.

Landscape architecture has its origins in the arts from a previous age when the conception of landscape design was confined to private gardens and parks. It is only since the early 20th century that the collective landscape has emerged as a "social necessity"²⁵. This was also an era during which landscape architecture became 'urbanised'.

Although, in landscape architecture, the Victorian park movement did adopt a social purpose during the late 19th century, it is the town planning movement that was particularly instrumental in providing the new perspective of landscape planning (at all scales) for its social effects, and thus it is here that the foundations of 'social design' in landscape architecture can be identified.

²⁴ op cit, JELLICOE, Geoffrey and Susan, 1987

²⁵ ibid

It is worthy of note at this point that modern urban design (in Britain) shares with landscape architecture not only a knowledge base but also a mutual academic concern as to the adequacy of the theory to underpin their respective disciplines. John Punter in recent years described the ‘theoretical vacuum’ that exists in urban design²⁶. Although, since making that statement British urban design has been experiencing the advent of new policy guidelines for the treatment of the design of the public realm (initially instigated by Lord Rogers), these policies derive from the theory base of a discipline whose roots lie in a combination of the garden city movement and neo-classical civic design, in the tradition of the visual-picturesque. Punter has been a key figure in translating the theory into policy in recent government papers²⁷, and the emergent criteria for design quality will be explored later in the thesis for their theoretical foundation.

The actual origins of the town planning movement as a social ‘instrument’ for change are traceable back to the 19th Century when William Morris founded the Arts and Crafts movement as an antidote to an age of industrial ugliness.²⁸ He, together with John Ruskin shared a wider concern for the drabness of nineteenth century towns and judgements were made about art, architecture and landscape design based on the *social* effect of the work. At around the same time, Camillo Sitte produced his essays on ‘City Planning according to Artistic Principles’ in which he analysed Old European towns for their civic and artistic character. Sitte abstracted a series of principles on which city planning might be based. Sitte and those following in his tradition – such as Gordon Cullen and Christopher Alexander – developed a type of critique where criteria to define and describe ‘urban quality’ were arrived at through visual analysis of streets, plazas and other human scale built settings.

The Garden City provided a social basis for planning and design at a broad scale. It emerged as a particularly British contribution to world planning and it was to provide a physical solution type, or ‘optimum social arrangement’²⁹, to a particular urban problem. Ebenezer Howard’s significant contribution was that he reinterpreted the

²⁶ PUNTER, John, “Urban Design Theory in Planning Practice: The British Perspective”, *Built Environment*, vol 22, no 4, 1996, pp 263-277

²⁷ (notably, CARMONA, Matthew, PUNTER, John, CHAPMAN, David, “From design policy to design quality. The treatment of design in community strategies, local development frameworks and action plans”, (RTPI, UCL, and Cardiff University), Thomas Telford Publishing, London 2002)

²⁸ CHERRY, G E, *Town Planning in its Social Context*, Leonard Hill Books, London, 1970

²⁹ *ibid*

social theme to meet the specific needs of his time – in this case the major concern was the emerging problem of overcrowding in cities and depopulation of rural areas.

Howard has been described as a social realist who recognised that

“Probably the chief cause of failure in former social experiments has been a misconception of the principal element in the problem – human nature itself.”³⁰

Howard’s solution type was entirely appropriate for the problem at the time. Howard’s ideals as a planner, together with the thinking provided by more practical architect-planners such as Raymond Unwin, were instrumental in the subsequent development of the town planning movement. This was a wholly British movement – one whose foundations are traditionally linked with Patrick Geddes’ thinking, in particular his application of evolutionary philosophy to town planning. Helen Meller³¹ however has suggested that Howard and Unwin’s approaches did not actually perpetuate true Geddesian thought.

The concept of ‘emergent evolution’ was central to Geddes’ thinking. Meller’s suggestion, which contradicts Cherry’s view, is that Ebenezer Howard’s vision, far from being ‘realist’, was a utopian ‘idealism’ where the garden city vision had to be deliberately created from the beginning and it bore little relation to the historical evolution of large cities or the needs of a particular society. Meller also states that the architect-planner approach such as adopted by Unwin, was limited, working on selected and small-scale improvement schemes to aim to achieve the maximum in terms of satisfying expectations from modern housing (here she quotes Nettlefold, stating that these were ‘light and air’ not just ‘gas and water’). She suggests that the main interest was in a modern aesthetic for the orderly use of space. Geddes, on the other hand offered a philosophical and practical understanding of the modern city life, in all its totality and complexity.³²

As an evolutionary scientist, Geddes was intent on trying to analyse and understand a city’s evolutionary ‘pattern’ of the past, in order to realise a pattern for the future. He recognised that because of the twin processes of 19th century industrialisation and urbanisation, unlike the past, future patterns could only be realised through conscious and deliberate thought. As a biologist Geddes recognised that not all evolutionary

³⁰ paraphrased by CHERRY, 1970, p 33

³¹ in SUTCLIFFE, Anthony (Ed), *The Rise of Modern Planning 1800-1914*. Mansell Publishing, London, 1980

³² *ibid*

changes were progressive, and his message was that inability to adapt to change and accept responsibility for the future could lead to social degeneration. This thesis suggests that that the same evolutionary philosophy is as applicable to the development of theory in landscape design as it is to the development of the landscape itself.

Although Geddes' message was simple, the means to achieve the objective was not. Starting from a biological basis, and rejecting the traditional academic 'book' approach, Geddes, 'the interpreter'³³, became convinced that new knowledge could not be gained without new methods. For this he was prepared to return to fundamentals in the hope that by this approach he would become self-conscious at a deeper level, and in doing so, find a 'path' towards the new kinds of knowledge he sought.³⁴ For this he developed an intellectual device in the form of a diagrammatic method of notation which he called his thinking machine (illustrated below in figure 2.2.1.i).

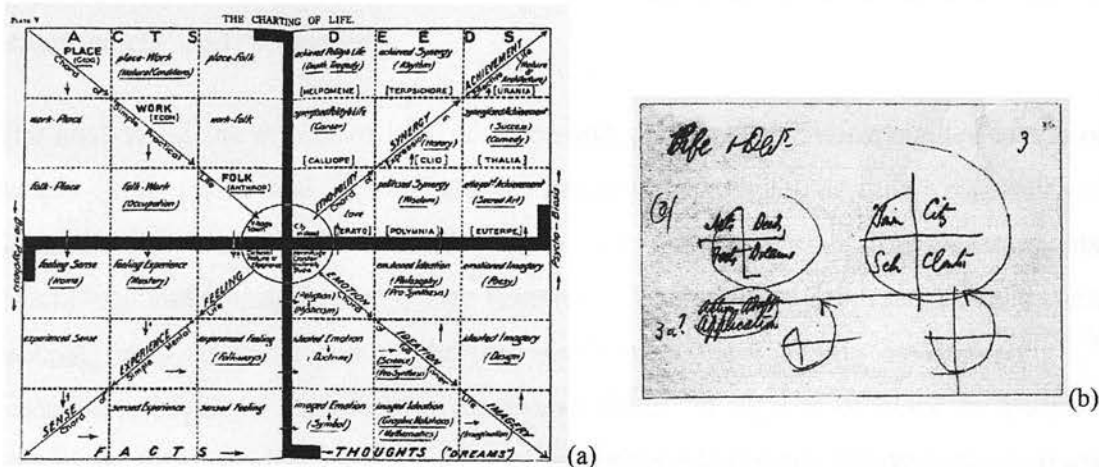


Figure 2.2.1.i - Patrick Geddes' 'Thinking Machine': (a) The Notation of Life; (b) Geddes' thinking in action: the 'Act-Deed and Town-City formulae (reproduced in WELTER, Volker, M, 2000, pp 32-33)

Geddes' notation device together with his place/work/folk triad became his thinking tools. These enabled him to develop techniques for the 'region survey' such as the valley plan and the valley section – the aspect of Geddes' thinking with which landscape architects are most able to identify (see figure 2.2.1.ii). Geddes' practical techniques allow for an interpretation of 'the region' as a cultural context where the interrelatedness of physical and human processes, and how each influence the other, can be analysed. It was out of this kind of holistic and inter-relational thinking - by which theoretical and practical 'doing' became interlinked - that the social theme became

³³ DEFRIES, Amelia – Geddes first biographer - quoted in WELTER, Volker, M, Biopolis. Patrick Geddes and the City of Life. MIT Press. USA. 2000

³⁴ op cit. in SUTCLIFFE, Anthony (Ed), 1980

established in the town planning movement (albeit that it may have been misinterpreted).

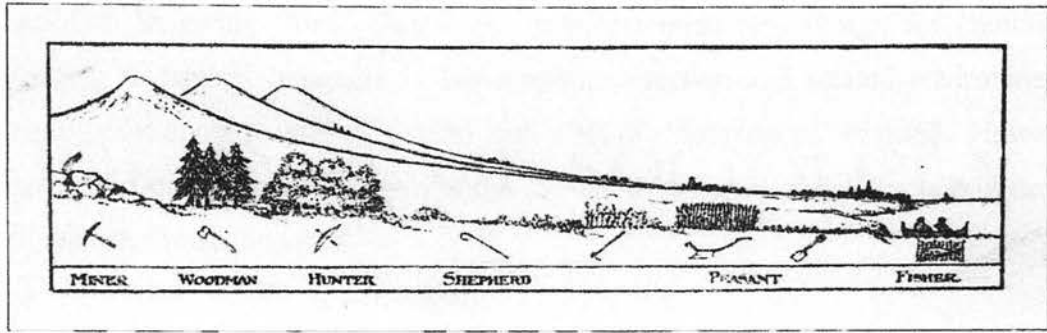


Figure 2.2.1.ii - Patrick Geddes' valley section (reproduced in WELTER, Volker, M, 2000, p 60)

The social theme remained linked to planning and housing in Britain mainly because of the interrelated concerns of overcrowding and the quality of housing built during the post-War years. This instigated a developing interest in the inter-relationship between 'environment' and 'behaviour'.

The analysis of the effects of lack of space and poor quality environmental design on people (both inside and outside spaces) became the subject of much research and dissemination during the 1960s/1970s in the emerging areas of environmental psychology and environmental design research. When it was later realised that social malaise, such as crime and vandalism, is related to poor quality environments^{35, 36}, researchers began to explore the 'cause and effect' of aspects of place on people's behaviour, towards identifying what could be changed to remedy the psychological and social problems associated with bad housing and other environment-settings, and thus improve design quality. However, with the arguable exception of Hillier's theoretical and practical exploration of the applications of 'Space Syntax' which first began to emerge at this time (this will be discussed later), environment-behaviour research became largely polarised from the practical process of design, it evolved into a distinct area of research in its own right, and has remained so ever since.

2.2.2 Design Theory – Concepts Of Space

From a physical perspective the landscape is a spatial medium. Space itself is the landscape architect's 'raw' material since the landscape is a *spatial* phenomenon.

³⁵ COLEMAN, Alice, *Utopia on trial: Vision and reality in planned housing*. Hilary Shipman, London, 1985

³⁶ NEWMAN, Oscar, *Defensible space: crime prevention through urban design*. Macmillan, New York, 1972

Spatial analysis is the key 'form-giving' design activity, and so 'space' is central to the theory.

In addition to giving 'form', landscape architects must also design for 'function'. According to Sancar, designers in landscape architecture and related environmental disciplines set about the design project with a set of 'convictions' in mind. However, these convictions are predominantly about the nature of form, whilst *function* in design is all too often misunderstood.

Grillo stated that function in design is often taken to mean 'the mechanical parts' of a program.³⁷ In landscape design these might be circulation routes, entry/exit points, and so on, and although aspects of design are, and must be, 'mechanical', the most functional aspects of design, according to Grillo, are not. These 'other aspects' are also the most difficult to define and become interlocked with the issue of design expression, originality, character and style.

Grillo states that the 'character of an activity' that is to take place in a building (or other environment) should find its expression in the whole design:

"There should not be any doubt about its function, when looking at it from any angle, inside, or out".³⁸

and that the pitfall of divorcing mechanical and structural function from character is to create in the end [buildings] that all look alike. But this is not the only pitfall. In addition to the problem of ubiquity in design, is the lack of integration of function with form, resulting in environments which cause confusion to the user. Examples include the situation where a user is trying to work out whether a building or a place is private or public (whether it invites or deters), or where people are unsure whether or not they have 'arrived' at a forest park for example (it fails to provide a sense of 'gateway' at the entrance), or in light of the many changes of use in buildings in recent decades in British cities, whether a building is a church, a bank, a café or a pub.

With reference to the design of outdoor space, Carr et al³⁹ identify the limitations of the approach which gives emphasis to physical attributes alone, stating that this gives 'a

³⁷ GRILLO, Paul Jacques, Form, Function and Design, Dover Publications Inc, New York, 1960

³⁸ *ibid*, p 231

³⁹ CARR, Stephen, FRANCIS, Mark, RIVLIN, Leanne G, STONE, Andrew M, Public Space. Cambridge University Press, Cambridge, New York, and Victoria, Australia, 1992

simplistic, deterministic conception' of the functioning of public places. For example, an entrance to a forest park with an extensive mountain biking facility or a church converted to leisure use, may have their entrances designed to be very entrance-like, but if they do not convey to the user its 'essential character' using some basic but clear 'visual messages' about what is likely to take place on entering, the user will feel uncertain: he might ask himself 'is this a church or a cafe?/am I allowed to go in?/what happens on entering?' or in the forest setting 'is this the right place for the mountain biking?/do I turn in here?/have I arrived?'. If such uncertainty exists, the 'entrance-place' is lacking in functionality beyond its basic 'entrance-ness' because its context of use within the life situation, has not been adequately considered.

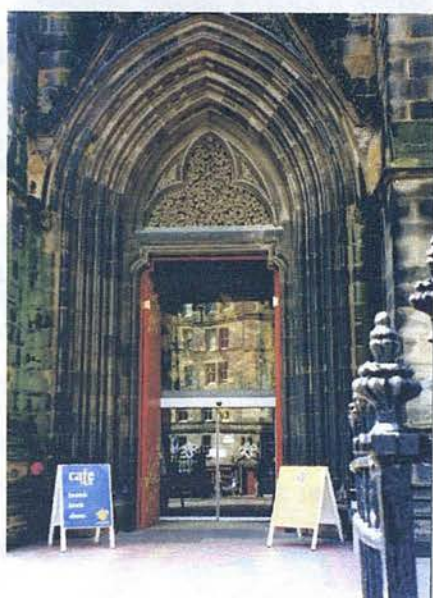


Figure 2.2.2.i - 'The Hub' in Edinburgh's old town: (Photo by author, 2001)

According to the manager of 'The Hub' centre in Edinburgh, illustrated above, the entrance caused visitors much confusion. This church was converted to provide an official centre for Edinburgh's International Festival, with a visitor shop, booking office and café inside. The centre is located at a busy nodal point and tourist area close by Edinburgh castle, with many tourists walking past every day. On observation, people were seen hovering around the entrance in an apparent state of uncertainty, sometimes hesitantly going in, looking to see what other people do, or turning away without looking inside at all. Although this entrance is very entrance-like in itself, in the context of its use where many tourists are 'browsing' the historic streets in the immediate vicinity. A combination of factors provide conflicting signals which appear to cause confusion, and even deter, visitors from coming in: the café-style signs against the strong church-like entrance, the highly reflective glass doors, and a lack of

announcement of the building's purpose, collectively provide an entrance with poor 'legibility of use'.

Unfortunately, the way landscape architects are taught and/or encouraged to analyse landscape character and form at the very early initial stages of education, *appears* to separate form and function. This must affect students' approaches later when they start to design places themselves. The basis of this statement was founded in observations made in the first year landscape school design studio.

Observation and Visualisation

In a first year spatial studies exercise entitled 'Observation and Visualisation', students were asked to "visually appraise" a locality in Edinburgh "with an emphasis on spatial analysis"⁴⁰. In the project brief, students were asked to think about the character of the space. There was no categorical emphasis given to the relationship between 'character', the human use of space and behavioural observation or of the idea of what a place 'means' in its pragmatic sense. However, behind the scenes the studio-lecturers had discussed ways of introducing these in the brief, but the belief was that this appeared to overcomplicate the exercise. As a consequence, these ideas were dropped and the focus remained on physical form in the belief that other considerations could be built in later and that, for now, it was important that these new students understood the nature of space itself, or as termed in the brief, that they developed an 'awareness of space'.

Students were asked to draw sketch elevations and plans to explore the physical attributes of space in sketch book format. During the presentation of their work in an informal 'round the table' crit, the students tended to focus on describing the physical form of the places they visited, rather like an inventory. But when encouraged to think about the character of the space and to express the initial response they had had on arrival at the different sites - by verbally describing their *experience* of the spaces - a number of students automatically interlinked the character of place with how it was actually used by people: for example one student described her experience of a cemetery as 'like a park'. When questioned why she had said this, she described her observations of people using it as if it were a park - sitting in it eating lunch and walking the dog/pushing a pram; another student who explored a different locality, described the park he visited as being a 'like a sportsground': he explained that this was

⁴⁰ as stated in project brief for: Programme no 1, 43.1AA1, Spatial Studies 1 – Observation and Visualisation, MA1, Term 1, Session 1999-2000, School of Landscape Architecture, Edinburgh College of Art

because its predominant usage was grass sports; a third student described the experience of walking under a particularly dramatic bridge, as 'like a gateway' – not because of any behavioural observation, but by becoming conscious of the factors that structured *his* landscape experience of passing from one space and entering another.

In each of the above three examples, the students were effectively summing up the prevailing character of a place (its 'essential character' to use Geddes's words) using a combination of behavioural observation of others using the landscape, their own experience of moving through and using the landscape, and spatial analysis (of physical form). The key to understanding 'character' appears to entail a summary of the prevailing use of a space ('like a park') or alternatively the predominant experience when using it ('like a gateway'). Both approaches necessitate powers of observation and perception in order to 'sift' out its essential character of use. However, the relevant observations had to be drawn out of students.

Landscape architecture is a taught degree where students rely heavily on the lecturer/studio-master's guidance and the first year in the design studio, in particular, is a critical phase. Marcella Eaton, through her examination of the use of the design studio⁴¹, described the teaching studio as a 'fragile' environment. The above examples corroborate Eaton's observations that students are very uncertain about what is expected of them in the early stages and are highly responsive to praise and criticism. Thus the studio-master has a key role to play in shaping the thinking process which, by default, encompasses ways of conceptualising and describing 'space'.

When students later begin to design their own spaces, the place descriptors of the type 'like a gateway' help students describe the type of landscape experience they want to create. A student from a different class to that described above, who was just entering her second year, was trying to design a combined pedestrian/cycle link between two urban spaces in Edinburgh. The brief comprised a one week sketch design. She had identified the need to facilitate the movement of significant numbers of walking and cycling people after initial site analysis, and she was clear in her mind that the link would be more than a strip of tarmac, that it would be a space in itself and that it would serve the purpose of a thoroughfare.

⁴¹ EATON, Marcella, 'Philosophy and Design in Landscape Architecture', PhD thesis, Edinburgh College of Art, Heriot Watt University, July 1997

By the end of the week, whilst others seemed busy at work drawing up their ideas to quite an advanced state of finish this student was ‘stuck’. The studio lecturer (this researcher) suggested that, rather than sit at the drawing board getting nowhere she should go out to seek and study other ‘thoroughfares’ in Edinburgh for inspiration. She subsequently went out on foot and found one that fitted the purpose: she identified the ‘Middle Meadows Walk’ in Edinburgh (figure 2.2.2.ii). She took a photo of this walkway and in the final crit she used it to describe her new design, stating that she proposed a link that was, in her own words, ‘like a boulevard’. Thus, ‘boulevard’ has a particular physical form (wide avenue with trees) which gives it a certain character, but



Figure 2.2.2.ii – Middle Meadows Walk. (Photo by author, 2003)

she came to identify it as an appropriate solution type because of its functional attributes or rather its experiential qualities. This was a well used cycle/footlink she discovered on her walkabout whilst looking for a design solution to her problem.

There was something about this student’s approach which seemed different to the general approach of others in her class, but hard to define. In this case the student’s thinking appeared to be channelled by ‘function’: this student seemed to arrive at form *via* function. In other words, she focussed on the need

to facilitate the movement of significant numbers of walking and cycling people, and to allow her informal, and yet focussed, observations of people doing this in real life to lead her to the appropriate solution type. The interesting aspect of her approach is that it does not exactly fit with the so-called ‘fact’ that design cannot take place in the absence of initial solutions: on the one hand this student had identified the need for a pedestrian link as a solution *type* (this was her idea, and not a stated requirement of the brief) and yet at the same time, she was having difficulty knowing how to arrive at its particular form-type: it was as if she did not know how to get there or as if she was resisting finding the solution too early on as if it would ‘contaminate’ the thinking process. But as soon as she could visualise the solution type, and she could describe it, she could put the project together in its final presentation format. This was effectively a Christopher Alexander ‘pattern analysis’ approach – albeit unconsciously followed.

Although no formal investigation was set up, out of a group of approximately 18 students the student described above was the only one who *appeared* to adopt this

particular approach – where her organising principle of thought was ‘function’, as compared with the more usual design approach which is ‘form’ driven.

Form-giving in landscape design derives from normative theories, design paradigms and ‘style’ precedents⁴². Since the landscape architect’s form giving medium is ‘space’ itself (specifically *open space*) it is on this which the design tools for giving form to the landscape are modelled in the discipline. This thesis considers that by enhancing understanding of ‘space’ and how it is conceptualised in the discipline, this will in itself enhance understanding of the gap problem. The role that ‘space’ has to play in the theory will therefore now be explored.

The history of ‘Space’ in landscape theory

New ideas on the conceptualisation of ‘space’ which began to emerge at the end of the 19th century evolved into fully formed design theories during the early part of the 20th century and these had a significant impact on landscape design. These new ideas were originally explored in the arts. Artists from the emerging European ‘Modern Movement’, through their various expressions - Futurism, Dada, Purism, Cubism, and so on - held a set of aims, interests and ideals which bound them together. These artists all agreed on their social conscience, their anti-establishment and anti-bourgeois tendencies, and their art focussed on visual content and ‘feeling’ rather than ‘facts’⁴³. This constitutes a significant shift in thinking.

The new interest in the arts focussed on the *relationship* between shapes and spaces. Artists became particularly interested in perceptual awareness. The idea of painting, drawing or sculpting ‘facts’ was no longer important and streams of thinking which had originated in the nineteenth century by the Impressionists and Pointillists in exploring ways of capturing the ‘impression’ of reality, were pursued.⁴⁴

The original concept explored by Cezanne, Renoir, Monet and Manet was in the use of elongated blobs and dots of paint with blurred edges to induce the viewer’s eye to combine the isolated blobs into whole forms:

⁴² loc cit, SANCAR, Dr F H, and Studer, Dr R G, 1997/1998, pp 29-54

⁴³ ROWLAND, Kurt, *A History of the Modern Movement: Art, Architecture, Design*. Ginn and Company Ltd, England, 1973

⁴⁴ BARRY, Anne Marie Seward, *Visual Intelligence. Perception, Image and Manipulation in Visual Communication*. State University of New York Press, Albany, USA, 1997

"Variations in colour and texture, rather than specific line edges, are interpreted by viewers as the boundaries of objects, separating them from their backgrounds, and like areas combine to form the shape of familiar objects and people."⁴⁵

This phenomenon became 'scientifically' explained by perceptual psychologists in the 'discovery' of a new law of perception. The 'Gestalt' was studied by psychologists in Germany during the period 1920-1950 and their work provided one of the first systematic attempts to study the way human perception 'organises' visual information.⁴⁶ The Gestalt concept comprises a set of principles of perceptual association in which the brain organises shapes into groups, or units. The idea of the Gestalt was recognised in the arts by the impressionists long before the perceptual psychologists put a name to it.

As a word 'Gestalt' does not translate into English easily, but it essentially refers to a whole pattern, or configuration, from which the entire 'field' can be seen.⁴⁷ Its key characteristic is that shapes are grouped into cohesive groups, or units. The opposite forces of 'segregation' and 'cohesion' are at work in the way the eye and human brain work together in generating these 'groups' of shapes.⁴⁸ It was these principles developed by the Gestalt psychologists that came to influence thinking in architecture and landscape architecture.

Gestalt principles, are based on one central law named the 'Law of Prägnanz'. This law (Pragnanz can be translated as 'conciseness' or 'succinctness') essentially states that

"a psychological organisation will always be as 'good' [ie simple, regular, symmetrical] as the prevailing conditions will allow."⁴⁹

A set of 'conditions' were understood to apply when producing 'good' visual form. These were: proximity, similarity, closed forms (closure), good contour (common density), common movement, and experience⁵⁰. As a principle for unifying perceptual elements into one single whole, this law stresses the tendency towards 'visual efficiency'. In other words the closer and more like the parts, the greater the attraction among them. According to this law of perception, because of the forces of cohesion and segregation the eye will complete lines according to the simplest 'best' shape

⁴⁵ op cit, BARRY, Anne Marie Seward, 1997, p 48

⁴⁶ EYSENCK, Michael W and KEANE, Mark T, Cognitive Psychology. A Student's Handbook. Psychology Press Ltd Publishers, East Sussex, UK 1998

⁴⁷ ASHCRAFT, Mark, H, Fundamentals of Cognition. Addison Wesley Longman, Inc, 1998, p 385

⁴⁸ op cit, BARRY, Anne Marie Seward, 1997

⁴⁹ ibid, p 487

⁵⁰ GOSLING, David, Gordon Cullen: Visions of Urban Design. Academy Editions, 1996

suggested.⁵¹ In the context of landscape architecture Bell illustrates below in figures 2.2.2.iii (a) and (b) how this works under the conditions of ‘closure’, as ‘enclosure’.

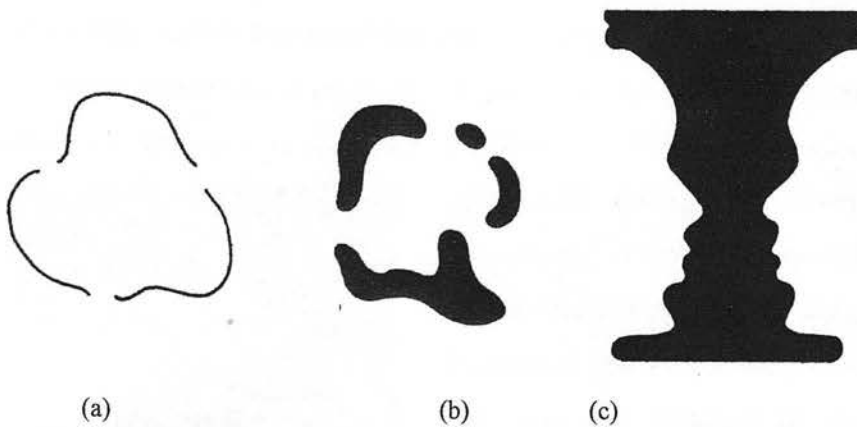


Figure 2.2.2.iii - The principles of Gestalt at work. (a) Enclosure by irregular lines and (b) enclosure by irregular shapes (BELL, Simon, 1993, p 118); (c) The figure-ground. (BARRY, Anne Marie Seward, 1997, p 51)

In the environmental design disciplines, the Gestalt concept is perhaps best known for the figure ground theory. This is a Gestalt theory demonstrated in the well known Rubin drawing of two faces in profile (figure 2.2.2.iii (c) above) which could also be seen as a vase depending on which we see as figure and which as ground. Although it is possible to change between the two interpretations rapidly, it is not possible to see them simultaneously.⁵² The reason why we can rapidly switch between interpretations is because the forces for segregation and cohesion are equal. In other words, the picture may equally be a vase or two faces depending on whether you are reading the solid (black) or the (white) space on the image. As a result, ambiguity occurs and the vase/faces oscillates between the two.

The concept of the figure ground reversal was of particular interest to those concerned with the urban environment. Gosling suggests that the whole concept of urban design relies on a classic figure-ground reversal, where:

“what is normally seen as ‘figure’ (buildings) must be read as ‘ground’, and what is normally seen as ‘ground’ (the surrounding spaces) becomes ‘figures’”⁵³

This figure-ground reversal is famously illustrated by Giambattista Nolli’s map of Rome in his 1748 drawing⁵⁴ in which Nolli conveys the texture of the ground plan

⁵¹ op cit, BARRY, Anne Marie Seward, 1997

⁵² GROOME, et al, *An Introduction to Cognitive Psychology. Processes and Disorders*. Psychology Press Ltd, Publishers, East Sussex, UK, 1999

⁵³ op cit, GOSLING, David, 1996, p 220

⁵⁴ LYNCH, Kevin, *Managing the Sense of a Region*. The MIT Press, Massachusetts, USA, 1976, p 121

created by streets, piazzas, church interiors, courts and gardens (see figure 2.2.2.iv). In the environmental design disciplines, the idea of the figure-ground reversal has become adopted and adapted for use as a graphic technique for defining spatial form in two-dimensions. Lynch suggested that the Nolli approach enables one to acquire a sense of the entire system of public spaces allowing for the judgement of their 'relative capacities, linkages and sequential form.'⁵⁵ The general idea of 'reversal' has



Figure 2.2.2 iv - Nolli's map of Rome. (LYNCH, K, 1976, p 121)

progressed through photocopy and computer technology: it is often favoured as a technique for visual representation of designs on landscapes because it provides a way of focussing the eye on the form and structure of the landscape, where 'space' becomes solid black and 'solid' becomes white space.

In the environmental design sphere, the Gestalt was most expressly, and consciously, explored by Gordon Cullen. Significantly, he considered the Gestalt in the context of the human use of the urban environment, and Cullen became key to the development of new ideas on perception in the social environment. In recognition of the fact that inhabitants of cities are continually having to 'identify key signals against chaotic backgrounds'⁵⁶, Cullen translated the Gestalt concept into a 'townscape theory'.

Cullen proposed that there is an 'art of relationship' just as there is an art of architecture. Its purpose, he stated, was

"to take all the elements that go to create the environment: buildings, trees, nature, water, traffic advertisements and so on, and to weave them together in such a way that drama is released. For a city is a dramatic event in the environment." To understand what this is, Cullen states, "we turn to the *faculty of sight*, for it is almost entirely through vision that the environment is apprehended."⁵⁷

Just as with the Gestalt psychologists, Cullen set out a series of theories within the overall theme of the idea of visual organisation. Notably, Cullen organised the visual environment into categories of 'place' and 'content', introducing experiential concepts such as 'hereness' and 'thereness', and in particular he presented a theory on optics and

⁵⁵ op cit, LYNCH, 1976, p 90

⁵⁶ op cit, GOSLING, 1996, p 220

⁵⁷ CULLEN, Gordon, *The Concise Townscape*. Butterworth Architecture, Oxford, 1961, 1971, p 7-8

serial vision. Most interestingly, for somebody who is said to have ‘rejected science’⁵⁸ Cullen developed his spatial theories based on the way in which the brain organises ‘information’ from the environment by way of the ‘optical split’. By Cullen’s description this is one in which the viewpoint separates between the *existing view* and the *emerging view*, but then synthesises the two.

In the sphere of cognitive science it is established that the visual system is the primary source of spatial information.⁵⁹ Cognitive scientists also identify a system that is split into two halves – but here the process is conceptualised in terms of ‘the what’ system and ‘the where’ system. This explains the way that humans ‘map’ their environments: first we identify key landmarks (‘what’) and then place them spatially in our minds (‘where’) and then synthesise the two in order to establish a spatial relationship between the two. In very crude and basic terms this is the mental mapping process that all human beings have to be able to undertake in order to move around in physical space.

In the context of this thesis, the optical split may be used as an analogy for ‘mapping’ the theory: by separating out the *existing view* (or ‘what’) from the *emerging view* (‘where’) one might gain an overall impression of *what* the theory is as it stands in contemporary landscape architecture, and what its potential is in light of *where* current thinking is heading. To return to the discussion on the influence of the Gestalt on landscape design, as with the modern artists, Cullen had a strong sense of social conscience coupled with an active interest in the re-definition of space and time. The redefinition of space had already evolved into a theme in architecture - ever since the Bauhaus School first adopted the idea from the Arts.

Siegfried Giedion together with others, notably Frank Lloyd Wright, developed theories on the concept of space, where space was seen as a neutral continuum with no distinction between internal and external spaces. Wright’s ‘Falling Water’ project for example, embodied his ideal of the building being fused into the landscape. Christopher Tunnard made a significant contribution in Britain with the publication of ‘Gardens in the Modern Landscape’ in 1938⁶⁰. This ‘manifesto’ called for the integration of aesthetic, functional and social purposes in land planning at any scale, and collaborating with architects such as Serge Chermayeff, Tunnard’s designs spatially fused the house

⁵⁸ op cit, GOSLING, David, 1996

⁵⁹ GOLLEDGE, R G (ed), *Wayfinding Behaviour*, Johns Hopkins University Press, USA, 1999

⁶⁰ WALKER, Peter and SIMO, Melanie, *Invisible Gardens. The Search for Modernism in the American Landscape*. The MIT Press, USA, 1994

and garden in a truly ‘modern’ way (figure 2.2.2.v). His influence on other key seminal

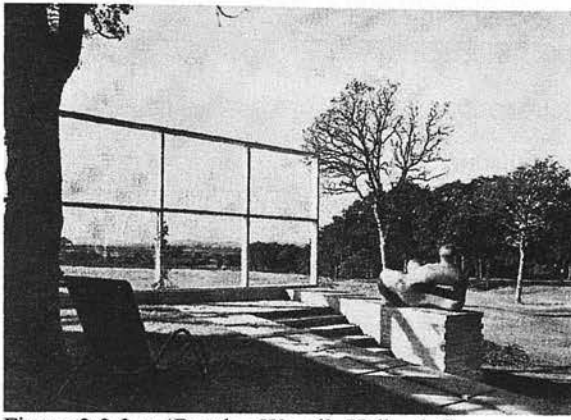


Figure 2.2.2.v: ‘Bentley Wood’, Halland, Sussex, Chermayeff residence, 1937-1938. (WALKER, Peter, SIMO, Melanie, 1994, p 148)

landscape architects embracing the social aspects of design, notably Lawrence Halprin, was the idea that the garden could be both a work of art, and serve the social needs of humans.

The significant ‘shift’ in landscape architectural thinking at this time was a change from the conceptualisation of landscape as a static, scenographic

‘picture’, to one in which the landscape is a dynamic medium:

“In modern landscape architecture, space was rediscovered as the great unifying medium. People, no longer merely spectators, became actors in the modern landscape.”⁶¹

In the arts, the concept of ‘movement’ in visual perception was first explored by the Cubist and Futurist painters and sculptors.⁶² In architecture the concept was developed in Giedion’s lectures ‘Space, Time and Architecture’ in which Giedion’s conception of time was presented from the perspective of a freely moving observer experiencing simultaneous, fragmented and multiple visions.⁶³ It was this *experiential* perspective of space that Cullen took particular interest in, and this was where he became instrumental in ‘modernising’ thinking in landscape architecture.

Space – as experienced

Cullen actively explored the experiential approach through practice-based enquiry by which he developed his theories. Cullen’s contribution to the development of landscape theory is, however, as limited as it is extensive, and must be considered in the context of the wider ‘gap problem’. Three problematic aspects of the general problem of space, are identified below as: a) the problem with Cullen; b) the problem of Gestalt; and c) the problem of space which subsumes i) a problem of inside/outside space, ii) a problem with the levels of space, and finally iii) a problem of landscape space.

⁶¹ op cit, WALKER, Peter and SIMO, Melanie, 1994, p 3

⁶² op cit, ROWLAND, Kurt, 1973

⁶³ op cit, GOSLING, David, 1996

A) The problem with Cullen

The problem with Cullen is that his approach is characterised by 'a rejection of science'. In rejecting science, Cullen rejected any sense of adding objectivity to his



Figure 2.2.2 vi: Cullen's artistic 'lens': pedestrian priority (CULLEN, Gordon, 1961, p 123)

conceptualisation of space, instead adopting a highly artistic approach. He made visual representation of the environment through his own subjective and idealistic 'lens' on life, albeit with a strong sense of social conscience. (See figures 2.2.2.vi and vii). Cullen was also intent on retaining a nostalgic link with the past.

Cullen's approach has been described as 'whimsical'⁶⁴, providing a visual-picturesque approach to the representation of 'reality'. One of the key features of Tunnard's work, as compared with Cullen, was that he was unsentimental about the past. Tunnard however appreciated the qualities of great [garden] landscapes of any era and culture and he believed in artistic, scientific, technological and social progression that was based on both past achievement and present opportunities.⁶⁵ Although, Cullen's theories are modern in their fusion of artistic and socially responsive notions of space, they are applied through a backward looking and highly subjective 'lens'.

Although Cullen's intention was to understand the nature of the urban experience from a more complex perspective than the visual experience alone - namely the sensory experience - his approach was an 'uninhibited personal and expressive response to space'⁶⁶, exploring the different meanings

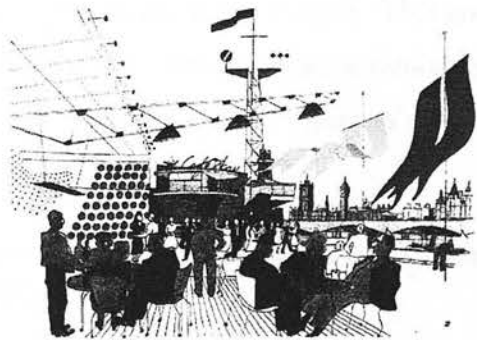


Figure 2.2.2 vii: Cullen's artistic 'lens': 'Bankside Regained'. (GOSLING, David, 1996 p 30)

⁶⁴ op cit, GOSLING, David, 1996

⁶⁵ op cit, WALKER, Peter and SIMO, Melanie, 1994

⁶⁶ JARVIS, 1980 paraphrased by PUNTER, J, "Urban Design Theory in Planning Practice: The British Perspective", Built Environment, vol 22, no 4, 1996, pp263-277

that places had for *him*. This approach inevitably privileges the perspective of the designer.

The limitations of Cullen's approach may be linked to a problem of the Gestalt.

B) The problem of Gestalt

In 1932 Norman Newton had cautioned that the fundamental issue was not modernity but quality⁶⁷. He stated that rather than ask 'is it modern' we should ask 'is it good and beautiful'. The problem is that Gestalt theory presents an open interpretation of what constitutes 'good'. The Gestalt was, and is, a 'lens' on the world that has and continues to have a significant influence on landscape designers' view of the world, and this is largely facilitated through Cullen's theories and spatial tools.

The limitation of the Gestalt is twofold: on the one hand the theory itself is no more than a series of descriptive statements that are open to subjective interpretation⁶⁸; and secondly, by the very nature of the fact that Gestalt is an efficient process for reducing reality to its simplest form, this in itself encourages an over-simplification of the perceptual world. In other words, what we see might not be reality since everything is open to interpretation.

Barry highlights the drawback of relying on the Gestalt for explanations of reality by referring to Spinoza's model of the mind⁶⁹. Spinoza's model states that when we comprehend something we automatically accept its existence as well. This goes against the rational view (that is, the Cartesian view) which presents a two-stage process whereby we interpret and then accept or reject an idea. Spinoza's view is that acceptance is part of interpretation:

"If the "off switch", which signals "no" to an idea is not activated, processed information – possibly emotionally laden ... - is simply accepted as true."⁷⁰

Because of the way the human mind reasons, according to Spinoza, the only choice we have once we have comprehended an idea is to reject it deliberately, or not. In other words, we are innately programmed to act first and think later. This is, apparently an

⁶⁷ op cit, WALKER, Peter and SIMO, Melanie, 1994

⁶⁸ op cit, EYSENCK, Michael W and KEANE, Mark T, 1998

⁶⁹ op cit, BARRY, Anne Marie Seward, 1997

⁷⁰ ibid, p 23

aspect of our evolutionary efficiency to trust our first perceptions and even respond to false cues, because in times of crisis the risk not to is too great. It is these apparently instinctual responses that affect our perceptual system:

"If Spinoza's model of the mind is correct, as current neurological thinking suggests it is, and we are doomed to first accept what we see as reality and to believe what we are told as true, it is only by deliberate thought and active higher reasoning that we can move into a wider circle of intelligence and truly appreciate what we see and understand how we come to believe."⁷¹

The limitations of Gestalt theory in the sphere of environmental design has been explored by Norberg Schulz, who examined it in terms of 'the problem of space'. This introduces a further 'dimension' of the gap problem in its historical/theoretical context.

C) The problem of space

The 'problem of space' was taken up by Norberg-Schulz in his book 'Existence, Space and Architecture'⁷². He introduced a theory of 'existential space' as an 'intellectual' bridge addressing the gap between concepts of man and his environment. Norberg-Schulz's writing is high level intellectualism and not easy to comprehend, but the concept provides a critical step towards bridging the gap problem – at least in theory.

Norberg-Schultz suggests that a conceptualisation of space in terms of a concretisation of the 'life-situation', is a more 'real' way of conceptualising the perception of space. This is one in which individual environmental images of space fit with man's general perception of 'being in the world'. Thus, he proposed a *cognitive concept* of space. This was one which rejected the 'absolute' laws of Gestalt in favour of a more 'flexible' spatial concept.

The concept embraces Piaget's theory on 'schemata'. This is an approach to mapping 'reality' which considers 'typical reactions to a situation' and provides a theory which explains perception in terms of the way humans develop a consciousness of space in direct relation to their experiences 'with things'. Piaget's studies identified the subjectively centred view of the world as developed by humans in early childhood. He demonstrated that the child's world view comprises a collection of separate 'spaces' each entirely centred on a single activity. He describes this level as the first order of

⁷¹ *ibid*, BARRY, 1997, p 68

⁷² NORBERG-SCHULZ, Christian, Existence, Space and Architecture. Studio Vista Limited, London, 1971

space and one which is built on in a topographical perception of the world - not in terms of fixed distances and angles and so on, but in terms of relational aspects – namely proximity, succession, closure, and continuity, within a hierarchy of *levels* of space.

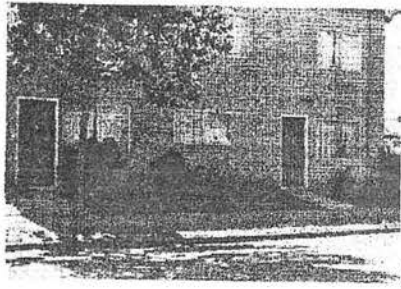
The basic organisational principles of Piaget's theory coincide with the Gestalt, but there is a key difference: the concept of space as a *system* of places is the necessary condition for conceiving of space from the existential point of view that Norberg-Schulz proposes. In accordance with Piaget, these places evolve through life experience as structured wholes characterized by the key principles of proximity (directions or paths) continuity (areas or domains) and enclosure. In this way, space is conceived in terms of 'the space of human interaction'. Towards the 'concretization' of this space, Norberg-Schultz suggests that Christopher Alexander presents a significant step towards a 'useful theory' of [architectural] space.

A pattern language

Alexander's 'A Pattern Language' is not a *pattern book* in the sense of providing a set of readymade solution types (or sourcebook) of spatial arrangements. Rather, the intention is to present a set of problems identified from real life situations, and an approach to identifying an appropriate solution type. This is essentially a manual of 'thinking' and 'doing' processes set in the context of the design process (see figure 2.2.2.viii, overleaf). The 'core' of the solution types are described – that is its properties - as components of the solution and these are presented as an aspect of 'the pattern'. The patterns comprise in total: a problem description; the core of the solution to that problem (the components), with pictures and writing to set the context within which the problem occurs; and a set of solutions. The solution, Alexander states is the 'heart of the pattern'. It describes

"the field of physical and social relationships which are required to solve the stated problem, in the stated context. This solution is always stated in the form of an instruction – so that you know exactly what you need to do, to build the pattern. Then, after the solution, there is a diagram, which shows the solution in the form of a diagram, with labels to indicate its main components".⁷³

⁷³ ALEXANDER, Christopher, A Pattern Language: towns, buildings, construction, Oxford University, 1977



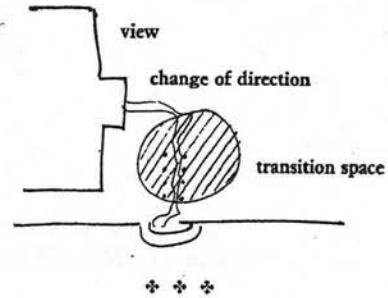
(a)



(b)

(c)

Make a transition space between the street and the front door. Bring the path which connects street and entrance through this transition space, and mark it with a change of light, a change of sound, a change of direction, a change of surface, a change of level, perhaps by gateways which make a change of enclosure, and above all with a change of view.



Emphasize the momentary view which marks the transition by a glimpse of a distant place—ZEN VIEW (134); perhaps make a gateway or a simple garden gate to mark the entrance—GARDEN WALL (173); and emphasize the change of light—TAPESTRY OF LIGHT AND DARK (135), TRELLISED WALK (174). The transition runs right up to the front door, up to the ENTRANCE ROOM (130), and marks the beginning of the INTIMACY GRADIENT (127). . . .

Figure 2.2.2 viii – Alexander's Pattern no. 112: 'ENTRANCE TRANSITION': the problem: "Buildings and especially houses, with a graceful transition between the street and the inside, are more tranquil than those which open directly off the street." (ALEXANDER, Christopher, 1977 pp 548-552). (a) 'bad' entrance transition; (b) 'good' transition space; (c) making a transition space.

The elements of existential space

Norberg-Schulz draws on Tuan's notion that although 'space' is more abstract than 'place', the ideas of space and place require each other for definition.⁷⁴ The practical problem of space and place in an experiential approach to landscape study was taken up by Tadahiko Higuchi.⁷⁵ He too emphasised the concept of space as a system of places occurring in the totality of space, in a flexible format. Using Lynch's five elements, he identified a set of spatial archetypes of 'experienced space'. Higuchi's work essentially explores the practical application of Norberg-Schulz's concept of space to landscape analysis (figure 2.2.2.ix).

⁷⁴ TUAN, Y, F, *Space and Place. The Perspective of Experience.* Edward Arnold Publishers Ltd, London, 1977

⁷⁵ HIGUCHI, Tadahiko, *Visual and Spatial Structure of Landscapes*, translated by Charles Terry, MIT Press, Cambridge, Massachusetts, 1983 (original in Japan 1975)

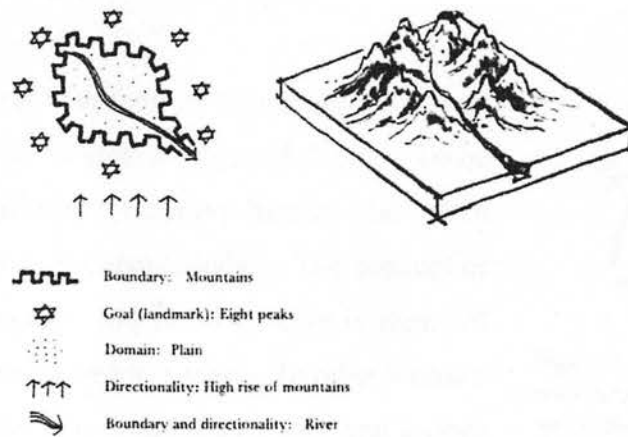


Figure 2.2.2 ix – The Structural elements of the ‘eight-petal lotus blossom’ type of spatial structure (HIGUCHI, Tadahiko, 1983, p 119)

Norberg-Schulz had described the elements of existential space as being both concrete and abstract. Whereas abstract space provides the more general schemata as studied by Piaget, the other concrete aspect of space refers to the environmental elements of landscape, townscape, buildings and physical things. He embraced Kevin Lynch’s work through a theory of ‘elementary interaction’ drawing on the path/ edge/ landmark/ node/ district perceptual model of the environment. Norberg-Schulz identified the key *elements* as being ‘paths’ and ‘domains’ and these comprised the basic schemata of orientation. According to the theory, when the constituent elements combine, this combined space becomes the ‘real’ dimension of human existence.

The flexibility of Norberg-Schulz’s concept of space originates in the fact that the schemata develop in childhood from the main ‘centre of the world’, that is ‘home’, to multi-centres that only exist *relative* to home. In the ‘real’ world, when places interact with their surroundings certain problems arise. There are three key aspects embedded in the theory which merit further analysis for they present a set of ‘sub-problems’ within the overall problem of space. These are: i) a problem of *inside/outside* space, ii) a problem of *levels* of space, and iii) a problem of *landscape* space:

(i) a problem of inside/outside space

When places interact with their surroundings, a problem of *inside* and *outside* is created (figure 2.2.2.x). To be 'inside' is the primary intention behind the place concept, according to Norberg-Schulz. The concept of inside is not necessarily 'indoors' but more in terms of the experience of being inside a space. In other words a place exists because it is 'somewhere' and you cannot enter a place unless you enter 'into' it, from being

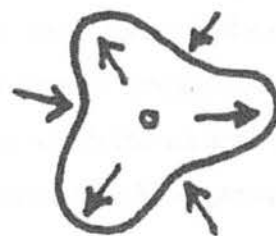


Figure 2.2.2 x: Places interact with their surroundings: inside/outside space. (NORBERG-SCHULZ, 1971, p 25)

'outside of it': thus place can only exist relative to outside. This links in with Yi-Fu Tuan's conceptualisation of space by which he states is 'an ordering of reality' which occurs depending on how you view it.⁷⁶ Tuan distinguishes between the 'side view', as opposed to the 'vertical view'. The side view, Tuan states, is one in which the person is *in* the environment, engaged with it in some activity from which point the viewpoint is from within, as opposed to the vertical view which takes a viewpoint from abstract point 'above'.

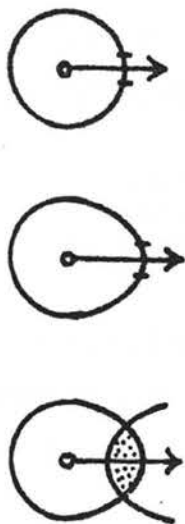


Figure 2.2.2.xi - The transition space is *relative* to the act of entering. (NORBERG-SCHULZ, 1971, p25)

The concept of inside is closely related to closure and place experience: any closed form has to be entered from a certain direction, and on entering 'into' the place, a new spatial area defines itself at the transition point. This transitional space is related to the experience, or act of entering, and materialises through the human interaction with the physical opening itself. In this way, Norberg-Schulz explains the psychological significance of 'the door' since it can close off or open up, unite or separate.

However, more than this, the transition space defines *itself*, upon the act of entering, (figure 2.2.2.xi), and the 'boundaries' of this space are therefore non-concrete even though they occur in relation to 'concrete' space. This is the nature of experiential space.

⁷⁶ op cit, MEINIG, D W, (Ed), 1976

ii) a problem with the levels of space

Interrelated with Norberg-Schulz's place concept are the twin concepts of path and domain. The problem with paths, he states, is the choice that they bring. Paths exist within a network and thus as a system, paths represent 'man's possibilities of movement'. Again this concurs with Tuan's landscape within which the vertical view provides the domain, whilst the side view provides the space within which people act.

According to Schulz, when paths and domains combine with the physical topographical conditions, domains of varying 'density' occur in our environmental image. When these domains exist at a high level of density, they are essentially experienced as 'shapes', whereas when they exist at low levels of density, they exist in a more neutral 'ground'. Furthermore, space occurs within a hierarchy of levels of space, in a figure-ground reversal where the landscape occurs at low level 'density' or 'ground' level and where urban space occurs at high level density, 'figural' level.

The spatial hierarchy occurs from a geographical 'regional' level, down to the small scale of the 'private' dwelling, down to the lowest level - 'the thing' itself. A 'Thing' may be a cupboard or chest of drawers that we interact with at human scale and so at this level, the system of places and paths no longer applies. Rather, 'things' are connected with basic actions, but essentially they do not 'exist' unrelated to the whole level-hierarchy of space:

"Existential space can ...be described as a simultaneous totality where the levels interact to form a complex, dynamic *field*. Through perception, parts of the field are experienced, but the general image exists independently of the individual situation."⁷⁷

The general image to which Norberg-Schulz refers is one which occurs as an 'agreed' general conception of the world, whereas in its specific details it is formed by our own individual experiences with it.

⁷⁷NORBERG-SCHULZ, Christian, Existence, Space and Architecture. Studio Vista Limited, London, 1971, p 33

iii) the problem of landscape space

Norberg-Schulz distinguishes 'landscape' from 'geography'. He states that the landscape sits within a broad, geographical space, which is more of a 'thought' of space rather than one that is lived in. The geographical level gives identity to 'objects' such as 'Europe', 'country' or 'region', capturing a combined economical and ecological framework of man's orientation in the widest sense, whereas the landscape has

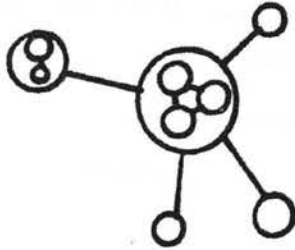


Figure 2.2.2 xii - A hierarchical system of centres (NORBERG-SCHULZ, 1971, p33)

'structural properties'. The hierarchical nature of the levels of space within which the landscape sits are related to the ecological concepts of 'network', 'node' and 'surface' to describe the background geographical structure. However, the landscape provides the continuous background of our *visual* field and thus of our environmental image.

The landscape exists by its structural properties which, Norberg-Schulz states, ought to be describable in terms of places, paths and domains. The dynamic 'field' exists as a system of centres. This usually occurs with one centre dominating, and each related by paths (figure 2.2.2.xii). The 'problem' with landscape, according to Norberg-Schulz, is that it has 'weak formal properties' and is generally of a 'diffuse' nature. However, at the urban level he describes the town as a single identifiable place with *figural* character in relation to the landscape, where the principles of closure and proximity form the constituent elements. In larger cities, the urban structure forms a hierarchical system of its own, and at this level the theory draws on Lynch's notion of paths and districts as being the constituent elements of this system. The network created becomes a coherent 'action-pattern' according to the type of activities and topography (figure 2.2.2.xiii).

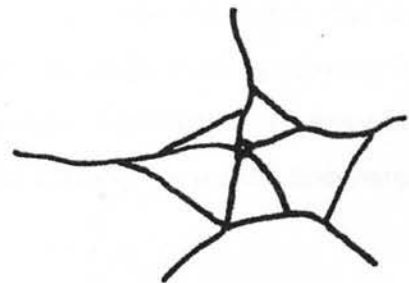


Figure 2.2.2 xiii - Network as a 'coherent action-pattern'. (NORBERG-SCHULZ 1971, p 26)

As demonstrated by the above paragraphs the conceptualisation of experiential space, or existential space by Norberg-Schulz's terminology, is, like the landscape itself, characterised by complexity, and it defies a simple explanation.

The limitation of the theory

Theory building involves more than describing the world.⁷⁸ According to Lang, it is a creative process that involves the development of conceptual structures that both order and explain observations:

"The goal is to be able to use these structures to describe what is happening and to predict what is going to happen."⁷⁹

This is the nature of 'positive' theory as opposed to normative theory. The former type of theory is more concerned with obtaining descriptions and explanations for the purpose of raising consciousness as opposed to normative theory that simply states what should be done.

Normative theory is based on ideologies of the world, prescribing what good architecture, landscapes and urban designs should be. Thus, it may be said, this type of theory is more concerned with 'facts'. The goal of Positive Theory on the other hand is 'to enable people to derive a large number of descriptive statements from a single explanatory statement'⁸⁰ which Lang terms 'economy of thought'. In this respect Norberg-Schulz's theory is of limited application.

One cannot design a place without being able to conceptualise space in the first instance, and one's capability to conceptualise space depends on the theories available to explain and describe it, together with the tools to translate the theory into practice. The theory, as it stands, appears to be inadequate to the understanding of space from an experiential point of view because it defies a simple explanation: Norberg-Schulz's concept of experiential space is difficult to define verbally (in words) and visually (in images).

The potential of the theory

Lang believes that understanding the distinction between Normative and Positive theory is important in order to clarify the contribution of the behavioural sciences to environmental design. Lang believes that Positive theory building provides the most

⁷⁸ LANG, Jon, *Creating Architectural Theory. The Role of the Behavioural Sciences in Environmental Design*. Van Nostrand Reinhold, USA, 1987

⁷⁹ *ibid*, p 13-14

⁸⁰ *ibid*

promising approach to ensure the behavioural sciences are contributing to design. However, he notes that the environmental design professions have been slow to do this, stating that designers generally take the view that common sense is all that is needed to practice well. In addition, Lang cites a criticism of the design professions which suggests that one of the major reasons for the lack of explicit positive theory is a fear that systematic research will lead to a public challenge of some 'cherished' beliefs about the nature of architecture, landscape architecture and urban design.

Disengagement of designers from formal theory building engenders a lack of understanding of the nature of theory itself. In theory building in general, 'Theory' can refer to a prescription, a model, or prediction⁸¹. The former refers to normative theory by which design principles, standards and 'manifestoes' come into play. Theory as a model, provides a philosophical position as well as a mental schema, whilst theory for prediction can be achieved through certain actions. The value of positive theory lies in the latter two areas by which its explanatory and its predictive power come into play. Lynch has contributed much to the theory of landscape design in this respect.

In the design sphere Lynch is mostly linked to his publication 'Image of the City'⁸². However, he produced many other works which contributed to the knowledge. His general theme was the forging of links between spatial and human-centred theories. Notably, in his book 'Managing the Sense of a Region'⁸³ Lynch refers to the 'sensed environment' as the scale at which we live, the unit of study and therefore the "boundary of discourse" for managing the environment at regional scale. The sensed environment is presented as something that oscillates between scales, in which trees, signs, seats, and places exist in the context of systems such as freeways and airbasins. Thus, Lynch emphasises the ease with which a landscape architect can move freely between 'local' small scale and large 'regional' scale. In this respect, the commonality with Norberg-Schulz' theory becomes apparent.

Lynch emphasises the dual conceptualisation of space in regional/local terms as being basic to everyday human living. He highlights the point that these are basic aspects of spatial cognition common to all people, the difference being that landscape architects are *consciously* aware of it. Because of Lynch, and in particular because of the 'Image

⁸¹ *ibid*, LANG, Jon, 1987

⁸² LYNCH, Kevin, *The Image of the City*, The MIT Press, Massachusetts, USA, 1960

⁸³ LYNCH, Kevin, *Managing the Sense of a Region*, The MIT Press, Massachusetts, USA, 1976

of the City', spatial legibility is instilled in landscape designers not only as a key design consideration but also as a design model. As well as helping designers to conceptualise space for themselves, the path/ edge/ node/ district/ landmark model helps visualise (and therefore represent) the landscape for communication of key landscape issues to others. In this way the theory translates into practice because it is both a thinking model and a practical tool.

The body of design theory helps in imaging the landscape. This is both a process and a product: as a 'process' this entails a mental ability, and as a 'product' this entails the production of a some sort of visual output, and the two are inextricably linked. Lynch's theory recognises this.

It is notable that, some twenty years after the original publication of 'Image of the City', on reflecting back, Lynch admitted he was uneasy with the emphasis he had given to the physical attributes of places and that he had set aside 'meaning' in place of 'identity' and 'structure'.⁸⁴ Carr et al, in their book aimed at promoting the 'human dimensions' of public space, suggest that place legibility should be considered not just in terms of 'imageability' for, although this is important, it is not enough. Carr et al suggest the place cues that designers use to try and provide 'legibility' should be considered in terms of what they mean to a user in practical utilitarian terms as well in an emotional sense. Landscape legibility that is of practical use to humans is that which enables the user to understand *what* a place is. By this definition

"Legibility is the ability of a place to communicate first that it is open to the user and then what is possible there, once the user is inside."⁸⁵

Legibility in landscape design should enable 'the user' to 'use' a place in additional ways to that of developing a clear cognitive map – (important though this is). This is a subtle shift from the more usual interpretation of Lynch's definition of legibility which emphasised the 'imageable' physical structure of the environment by which Lynch referred to:

"the ease with which its parts can be recognised and can be organised into a coherent pattern. Just as this printed page, if it is legible, can be visually grasped as a related pattern of recognizable symbols, so a legible city would be one whose

⁸⁴ CARR, Stephen, FRANCIS, Mark, RIVLIN, Leanne G, STONE, Andrew M, Public Space. Cambridge University Press, Cambridge, New York, and Victoria, Australia, 1992

⁸⁵ *ibid*, p 188

districts or landmarks or pathways are easily identifiable and are easily grouped into an over-all pattern.”⁸⁶

Lynch used the words ‘imageability’, ‘legibility’ and ‘visibility’ interchangeably. Although the three are inextricably linked, it is ‘imageability’ that most strongly interlinks design with landscape perception (the link that Lynch forged in the first place) since *imaging* the landscape is central to the design activity.

Imaging the landscape

The representation of the collective landscape by individual landscape architects remains unsatisfactory in the view of certain leading landscape design theorists. In recent times, James Corner has urged a shift in thinking in landscape architecture towards a broadened concept of ‘image’ in landscape, towards *an activity* in imaging that can better represent the collective perception of the landscape. Central to the process of making improvement in this area, according to Corner and others from his school of thinking, is recognition of the *creative* process of visualising the landscape:

“After all, space by itself is neither sensible nor imaginable, but is instead created in the act of imaging.”⁸⁷

Herein lies the problem: our conceptualisation of space is subject to what is ‘imageable’ in the theory but this favours subjectivity over objectivity, our perception is ‘biased’, and what we ‘see’ is merely our own interpretation of ‘reality’. Thus, there is a need to know how to structure an image of reality that is reached by a more objective approach, but without loss of the subjective response to place that is at the very heart of a designer’s ‘existence’ as a human being.

So far, the thesis has identified that there exists a body of theory contributing towards a conceptualisation of space as *experienced* - whether termed ‘experiential’, ‘existential’ or ‘sensed’ space. These concepts highlight the interlinked problems of space and place, and these continue to be the subject of discourse in contemporary thinking in landscape architecture, alongside other more urgent, and relevant issues of the time.

⁸⁶ op cit, LYNCH, Kevin, 1960, p 2

⁸⁷ CORNER, James, (Ed), *Recovering Landscape. Essays in Contemporary Landscape Architecture*. Princeton Architectural Press, USA, 1999, p 161

2.2.3 Design Theory – Contemporary Thinking

There is a new urge to take forward the profession by conceptualising and representing the landscape in new ways and by finding new applications of the profession's expertise. A key feature of this emergent phase is a conscious move towards a less deterministic and more humanistic approach to design – at least in theory.

Leading edge thinking by James Corner suggests generating theory on the phenomenon of landscape from a human centred perspective. Those who align with his thinking, for example Denis Cosgrove, agree that to the 'insider', as compared with the 'outsider', the everyday landscape is integrated with the 'diurnal course of life's events' and that there is no clear separation of 'self' from the 'scene'⁸⁸. The burning question is articulated by Christophe Girot, who asks:

"How can outsider designers acquire the understanding of a place that will enable them to act wisely and knowledgeably?"⁸⁹

Corner's writing theorises 'the landscape' as an 'instrument' for change with as yet unrealised potential in contemporary society. Although Corner's own work has now progressed it was the case until relatively recently that Corner's work was highly theoretical, and in need of translating into practice. His more recent work has manifested in a variety of practical outputs, although this is largely in the form of competition entries.

Many others who do not formally publish theories in conventional formats in established research journals, but who focus on practical outputs, have been given expression through the European landscape magazine 'Topos'. This has become a forum for progressive landscape architecture thinking in Europe. Ever since its foundation in 1992, 'Topos' has been instrumental in heightening awareness at a wide international level of the broad spectrum of European landscape architecture. It has helped develop an understanding of the cultural, regional and political differences in the application of concepts and theories, and it has raised awareness of the individual differences between designers with their widely varying backgrounds, skills, graphical styles, attitudes and beliefs, as well as raising awareness of more pragmatic aspects such

⁸⁸ op cit, CORNER, James, (Ed), 1999

⁸⁹ GIROT, Christophe, "Four Trace Concepts in Landscape Architecture", in CORNER, James, (Ed), 1999, p 60

as the means of financing projects⁹⁰.

Contemporary thinking on landscape design, as expressed in the pages of *Topos*, reveals a focus on the *potential* of landscape architecture, and in taking forward new ideas and approaches. To the landscape architecture student *Topos* has also become a kind of 'reference manual', not only for ideas for design but also for techniques in visual representation. In Britain such a resource is very valuable since, unlike a number of landscape practices and individuals across Europe, in particular the Netherlands and France, British designers do not operate in a country with the political conditions and the planning frameworks conducive to a flourishing of the profession's potential – although the situation is changing, particularly in the urban context. However on the whole, internally, mainstream landscape architects in Britain, as with the USA, are characteristically frustrated at the lack of opportunity to take forward new ideas through to implementation and the public perception of 'the landscape' is an aspect of this problem.

Two key themes in contemporary mainstream thinking – both in Europe and at international level – which have pre-occupied design discourse in contemporary landscape architecture are identifiable as a) defining 'the role' of the landscape and b) the public perception of 'the landscape'. These two themes highlight issues concerning the landscape architect's own role as a professional in the contemporary situation, and present two areas in which design and research overlap.

a) Defining 'the role' of the landscape

For a time, debate was focused on attempts to find a composite definition of what landscape architecture *is*. This line of enquiry has become somewhat outdated and the current focus of attention concentrates on the idea of what 'the landscape' itself, and 'the landscape architect' can *do*. But, if a base definition of landscape architecture is required, it may be summarised as an act of mediation between culture and nature. To be a little more expansive:

"Landscape architecture involves the spatial organisation of outdoor places to meet human needs and desires while protecting or enhancing natural environments and processes."⁹¹

⁹⁰ SCHÄFER, Robert (ed), *Topos*, no 21, December 1997, p 4

Such a general description leaves much scope for individual designers to attach their own definitions for what they do.

What landscape architects 'do' can vary from country to country as well as between practices and individuals. According to Arnold⁹², French landscape architects prefer to describe what they do in terms of their individual expertise such as 'park designer', rather than 'paysagiste' as is their professional title. This is in order to set themselves apart from landscape gardeners who share the same title.

Given the diverse nature of the subject matter (ie, 'the landscape'), the variety in knowledge and skill base of individual designers, and the consequent increasing variety of practical applications of landscape architecture, a definitive description of 'what we do' is perhaps both impossible and undesirable.

In a world where roles and boundaries are blurred, where architects and the general public are taking an increasingly active role in the design, planning and decision making in the landscape, the need to distinguish landscape architecture as a distinctive discipline in its own right, however becomes more, not less, critical if we are to make public what the profession's role *could* be, rather than what it actually is. This general theme characterises Corner's 'manifesto' for the profession in which he urges the *recovery* of landscape.

Whilst mainstream landscape architects are focussed on the potential of the discipline, in the research sphere, a central academic concern is with bridging the research/design gap. Theorists who oscillate between the two areas of environmental design (architecture) and the behavioural sciences, notably Hillier and Lang, highlight the need for theory that emphasises looking at how things actually are. Broadbent had described some thirty years ago that designers would need to adapt to a changed modern culture which he characterised as 'the age of analysis'.⁹³ In light of the nature of the applicability gap problem of which 'problem-setting' and problem analysis are central issues, this thesis suggests the need to look at how things are in a different way, through a new 'lens'. For this it suggests the use of Tuan's 'side view'.

⁹¹ DEE, Catherine, *Form and Fabric in Landscape Architecture. A visual introduction*, Spon Press, London and New York 2001, p 1

⁹² ARNOLD, Françoise, "France: doing something for cities", *Topos*, no 27, June 1999, pp 6-15

⁹³ BROADBENT, G, *Design in Architecture: Architecture and the Human Sciences*, John Wiley and Sons, London, 1973

b) Public perception of 'the landscape'

The public perception of the landscape is a powerful influence and it has taken on momentum through the use of public consultation in the planning process. The need for such a structure reflects the dissociation that exists between people and the landscape in modern living and furthermore, it relates to how the phenomenon of 'the landscape' came to exist in the first instance. As described by Bourrassa, the modern concept of landscape developed contemporaneously with the change from feudal to capitalist modes of land tenure.⁹⁴ As the intimate tie between land and its users was severed with the development of capitalism, the idea of landscape arose. In other words, it became possible for people to distance themselves from the land so that it could be viewed as 'landscape'. But this is as much a problem in the design sphere as it is in the public sphere: in design it has engendered the 'master view' and in the public arena the separation of people from a working landscape stirs up nostalgic feelings engendering a sentimental view of rural and urban-historic landscapes.

The need for public consultation and participation is interlinked with the issue of consumption of the landscape, and both relate to the wider issue of landscape perception.

Landscape perception

Landscape perception binds tourism, leisure and recreation which are key driving forces in the design, planning and management of both urban and countryside landscapes. Distinct changes in patterns of use of public space have become established as ways of modern living in Britain, as with much of the rest of Europe, and economic dependence on activities such as urban tourism and shopping, and more recently the café culture society, are examples of everyday living and the visible manifestation of a consumer-driven, leisure oriented society. The British countryside too has changed as a result of our consumerist and leisure interests.

Tracts of land once given over to forestry and agriculture for purely utilitarian (crop) reasons, are now given over to recreational use such as mountain biking, forest walks and four-wheel drive adventures. The transition from crop use to recreational use in British forests, has necessitated a conscious effort by the Forestry Commission to shift

⁹⁴ BOURASSA, Steven, C, The Aesthetics of Landscape. Belhaven Press, London, 1991

its thinking in terms of forest design, management and cropping procedures. Social research in forestry is therefore a relatively new phenomenon since previously research was focussed on the development on visual strategies for design.

Forestry

In Forestry, the 'visual landscape' embodies landscape perception and visual communication. The need for creative design of afforestation and forest harvest became imperative in Britain from the late 1970s/early 1980s, as compared with America, due to the nature of the conditions under which British Forestry takes place: this is afforestation of bare land in a small country with a large population with limited scope for hiding forest plantations.⁹⁵

The British Forestry Commission, as compared with its American counterpart, took a lead in developments towards, what Simon Bell has termed, the 'positive design' approach, as compared with the 'screening and hiding' approach. Visualisation has become an important tool largely because of its application to the issue of engaging the public in the thinking process. Notably, computer programs with geographic information systems (GIS) capabilities have become key decision support tools in rural landscapes in particular, for their enhanced abilities to produce realistic visualisations, facilitating dialogue between experts and non-experts.⁹⁶ Bell suggests that to increase public understanding about land patterns, and the aesthetic response, is to lead the way to better overall results. This is a 'positive' approach to design and it places responsibility on the designer/planner to communicate key issues effectively to the non-design trained public.

The nostalgic view of the landscape by the general public at large is a hindrance to the landscape profession. Outwith Forestry, but within the arena of landscape design discourse, James Corner is disparaging of the public obsession with the preservation of the past, blaming consumerism as the driving force behind the suppression of [designers'] ambitions to experiment and invent.⁹⁷ Tourism is perhaps the most significant aspect of consumerism in the landscape and one of the driving forces behind the 'heritage industry'.

⁹⁵ BELL, Simon, "Landscape pattern, perception and visualisation in the visual management of forests", *Landscape and Urban Planning* 54, 2001, pp 201-211

⁹⁶ APPLETON, Katy, LOVETT, Andrew, "GIS-based visualisation of rural landscapes: defining 'sufficient' realism for environmental decision-making", *Landscape and Urban Planning*, no 65, 2003, pp 117-131

⁹⁷ op cit, CORNER, James, (Ed), 1999

Tourism

Tourism may on the one hand be considered a key driving force behind the suppression of innovation in historic cities, for example, but on the other hand it can be a generator, or catalyst, for design. Tourism, as a concept, is highly significant to contemporary landscape architecture because it is integral to every day modern living. Jan de Graaf⁹⁸ called for a cultural and critical approach in landscape architecture to highlight the potential of architecture, urban and landscape design in Tourism. de Graaf rejected the definition of tourism which views it as an attack on nature. Rather, he sees Tourism as a potential means of creating new landscapes and in this respect he identified a tension between regionalism and internationalisation (or globalisation) – which were key topics at his time of writing.

With particular reference to the urban context, the paradox of post-modern tourism is that in our search for new cultures, traditions and architecture, we end up in places where everything looks the same. Tourism today is universal, but its universality occurs in many senses of the word. As well as the physical effects on design, there is a behavioural effect. Because of our increased leisure time, the barriers between different ways of spending time are merging and free time does not exist any more: now all time is optional time.⁹⁹

A brief history of tourism identifies a theoretical link between landscape perception and concepts of leisure and tourism.

A brief history of tourism

Historically, Tourism has its roots in the Romantic movement which started in the 18th Century. It was the Romantic writers', poets' and artists' representations of the landscape that generated a whole new public 'desire' for the landscape experience. Romanticism triggered a whole new way of seeing and ultimately led to the development of 'scenic tourism'.¹⁰⁰ In the modern context scenic tourism has evolved into a phenomenon that became described by John Urry as 'the tourist gaze':

⁹⁸ DE GRAAF, Jan, "Coast Wise Europe – Accelerating Tourism?", *Topos*, no 13, Dec 1995, pp 95-103

⁹⁹ *ibid*

¹⁰⁰ URRY, John, *The Tourist Gaze. Leisure and Travel in Contemporary Societies*. Sage, London, 1990

"The tourist gaze is directed to features of landscape and townscape which separate them off from every day experience. Such aspects are viewed because they are taken to be in some sense out of the ordinary. The viewing of such tourist sights often involves different forms of social patterning, with a much greater sensitivity to visual elements of landscape or townscape than is normally found in everyday life. People linger over such a gaze which is then normally visually objectified or captured through photographs, postcards, films, models and so on. These enable the gaze to be endlessly reproduced and recaptured."¹⁰¹

The Romantic movement had instigated a shift in values by which emphasis was placed on the intensity of the emotion and sensation, on poetic mystery and in hedonistic pleasure. Urry states that the Shelleys, Lord Byron and the Wordsworths had suggested that one could feel emotional about the natural world and that scenery was something one could gaze at in delight.

In contemporary times, cities are as much a part of the tourist gaze as areas of 'natural' beauty. Not only are cities the 'gateways' for international tourism, but they are destinations in themselves. However, different cultural groups have a different view of what leisure entails in tourism. It is notable that some years ago the Australian Tourism Commission had to change their marketing strategy to attract the South East Asian market, when they realised that by advertising pictures of vast empty landscapes in an alien cultural context, Japanese visitors were being put off. This contrasts with eighteenth century Britain when Romanticism persuaded residents of the newly expanding industrial towns and cities that they could greatly benefit from short periods away to view nature.

Jay Appleton highlighted the significance of the Romantic movement to landscape perception. New ways of thinking emerged as Romanticism progressed into the 19th century and it became influenced by the new scientific, rational way of thinking of the industrial era: this instigated a further shift in ways of seeing.

There was a new urge for 'accuracy' in observation and, whereas the arts and literature had traditionally drawn exclusively on the imagination, now there was an added dimension. Appleton highlights that Dorothy Wordsworth developed new powers of observation when she came to realise for example that 'regional boundaries' could exist in the landscape through changes in vegetation, or its geography: she came to realise that the landscape had its own boundaries, whereas previously the painter had artificially imposed boundaries. In this way, Dorothy Wordsworth came to accept

¹⁰¹ *ibid*, URRY, John, 1990, p3

‘scientific’ observation not as a conclusion in itself, but as a premise for further detailed enquiry. This point that will be returned to later in the thesis.

As an *academic* subject, Tourism is very ‘young’ and is generally considered an applied area of economics, since this is where, theoretically, the emphasis lies.^{102, 103} Given the diverse nature of tourism, many disciplines can and do take the activity of tourism as an application of their own ideas and concepts. Tourism encompasses concepts such as ‘place’ and place identity or more pragmatic issues such as visitor parking and circulation, and so on. Consequently, in landscape design discourse, tourism is generally embedded within discussion of the landscape in general, or within critique on design in tourist occupied landscapes.

Tourism, place identity and user-needs issues are inseparable themes in landscape architecture since they become embodied within the design process itself. For example, in 1996 a new car park complex and visitor entry area was completed in Granada, Southern Spain, to reorganise the parking facilities and provide a new visitor reception area at Alhambra palace. Although the designers were in fact architects, the critique itself took place in *Topos*¹⁰⁴, the European landscape design journal, in an edition dedicated to ‘pathways’. This provides a landscape architectural interpretative framework for discussion.



Figure 2.2.3.i: Pathways and channels articulate various ‘zones’ of irrigation throughout the design for the Alhambra car park. (NIGST, P, 1996, p83)

¹⁰² GUN, Clare, A, *Tourism Planning: Basics. Concepts. Cases.* (3rd edition) Taylor & Francis, Washington D.C and London, 1994

¹⁰³ GUN, Clare, A, *Vacationscape: Developing Tourist Areas.* Taylor & Francis, Washington, D.C, 1997.

¹⁰⁴ NIGST, Peter, “New approaches to the Alhambra, Granada”, *Topos* 15, 1996, pp 80-86

The designers of the Alhambra project won a prize in an ideas competition to resolve the parking and tourist management problems. The design subsequently became built and the article describes how the designers sought to create a 'district' of Granada that is fully integrated into the landscape (see figures 2.2.3.i and ii). This is a landscape which is predominantly productive land characterised by a network of irrigation channels and cultivated olive grove terraces. The designers 'articulated' various 'zones of irrigation' by means of terraces, contours, buttress walls and irrigation channels and thus, they used the same patterns, scale and geometry, (its 'inner logic' as described by the architecture designers), to structure the new complex as that which articulates the existing landscape – one which has evolved over centuries of human/environment interaction. In this way the design uses the existing 'language' of the landscape as a device to ease their modern parking and visitor complex facilities into this historic, cultural landscape, and yet which does not, to quote the article, 'kow-tow' the past. It is this kind of cultural approach to design that Corner refers to as providing the way forward for innovation, and for generating useful discussion, about the landscape.

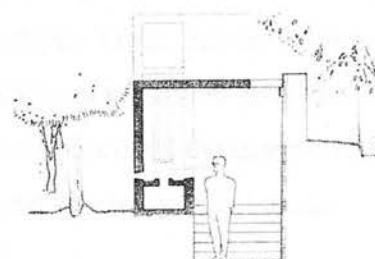


Figure 2.2.3.ii - Covered footpaths and irrigation channels run side by side, carrying visitors from the car park to the Alhambra entrance. (NIGST, P, 1996, p84)

Meanwhile, in landscape theoretical discourse, thinkers consider tourism in the context of cultural and environmental issues.

The cultural/environmental perspective

Tourism is both an environmental and a cultural issue. Corner rejects the environmentalist position in favour of the cultural view, since it is cultural 'ways of being and acting in the world' which, he states, lie at the very root of environmental problems in the first place. Tourism is one such 'cultural act'.

Corner is disparaging of the heritage/conservationist view, but he also rejects the 'environmentalist' stance. Corner criticises the failure of environmental groups to consider the world's 'constructedness': he denigrates the view which considers that the

landscape should be solely under the stewardship of the natural world as being mistaken in their conceiving of the environment as being outwith the *cultural* world.

Managing tourism is a balancing act between economic benefit and environmental degradation. It is also a way of life in contemporary western society where for example, the business traveller is also a tourist, and the new wave of café culture in Britain now enables us to act out our hedonistic desires on a daily basis. But there is a big difference between leisure-seeking residents of a city, and being a tourist. From a design perspective the everyday influx of tourists to cultural centres such as Edinburgh in Scotland, entails the need to make provision for ‘outsider’ people spending time in an alien environment. Thus when Denis Cosgrove, Christophe Girod, James Corner and others stress the need for new theoretical frameworks which help explain how ‘outsider’ designers can design for ‘insider’ people, when considering tourism, the question might be turned around: in this instance the user is ‘outsider’ and the designer is ‘insider’.

The cultural/biological perspective

Corner urges the need for new theoretical frameworks for a *cultural* approach to design. However, some years previously a limitation of the cultural perspective was highlighted by Jay Appleton in his publication ‘The Experience of Landscape’ in 1975, out of which the ‘prospect and refuge’ theory emerged. In this work, Appleton stated the need for a biological framework which embodied the cultural perspective. Appleton distinguishes the ‘cultural landscape’ from ‘scenery’ and although his search was for a theory of landscape aesthetics, his definition of the aesthetic response was one founded in the human experience of landscape.

In response to Appleton’s original book, scholars understood him to be denying the validity of ‘culture’ in favour of ‘biology’. In response to a misconception of Appleton’s argument, in his second edition published in 1996, he clarifies his argument:

“...while cultural, social and historical influences are of great importance, they do not operate in a vacuum. If they are formulators of taste, they shape it, not out of nothing, but out of something which is already there. In 1975 that ‘something’ was by no means clearly defined; indeed its very existence was not universally acknowledged. It was therefore necessary, if not to define it, at least to identify the area in which we were most likely to find it. I suggested ...that the most fruitful inquiries were likely to take place in the biological sciences, in ethology, in psychology, in ecology, and in genetics itself. Where I now think I missed an opportunity was in not giving enough attention to the relationship between the biological approach and the ‘cultural’ interpretation which generally prevailed.”¹⁰⁵

¹⁰⁵ APPLETON, Jay, *The Experience of Landscape*. Revised Edition, John Wiley & Sons, England, 1996,

The relationship between the biological approach and ‘cultural’ interpretation of the landscape, underpins much of the exploration conducted in subsequent chapters to this thesis. However, to complete the discussion taking place here, some further exploration on the ways in which core knowledge translates into practice will now take place.

2.3 THEORY INTO PRACTICE

In landscape architecture, designers rely on spatial analysis to conceptualise, generate an understanding, and visually represent places. The ability to define spatial structure in the landscape is a fundamental skill requirement.

Spatial analysis is an observation based activity combining ‘seeing’ and ‘doing’ through hand and eye co-ordination. This enables the designer to both identify problems and identify solutions – after all, problem analysis is integral to the whole design process and it is here that the ‘thinking’ is inextricably linked to the ‘doing’.^{106,107}

Reflecting on spatial analysis ‘in action’

Spatial analysis is a tool you cannot understand until you actually ‘do’ it. In the design studio a group of first year landscape students appeared to have great difficulty in understanding what it was they had to do for their ‘no 2’ spatial studies exercise (following on after the exercise in ‘observation and visualisation’ referred to earlier). For this, the brief asked them to conduct a visual study of two walking routes. Cullen¹⁰⁸ was a key reference source and although other references were given, such as the Appleyard/Lynch/Myer ‘View from the Road’¹⁰⁹ study, the classic images of Cullen’s ‘Case Book: Serial Vision’ were presented and emphasised in the hand out to the exercise. These were used to illustrate what was expected of the students. Some basic observations of the students’ difficulties arising out of this project highlight the limitations of an over-reliance on the use of Cullen in developing spatial awareness in the landscape.

Students ran into problems when trying to apply the spatial sequence technique to a walking route which did not pass through the type of environment that Cullen presents.

¹⁰⁶ SCHÖN, Donald, A, *The Reflective Practitioner: How Professionals Think in Action*. Temple Smith, London, 1983,

¹⁰⁷ SCHÖN, Donald, A, *Educating the reflective practitioner : toward a new design for teaching and learning in the professions*. Jossey-Bass, San Francisco, 1987

¹⁰⁸ op cit, CULLEN, Gordon, 1971

¹⁰⁹ APPLEYARD, D, LYNCH, K, MYER, J R, *The View from the Road*, MIT Press, USA 1964, p 235

One group of students had to analyse the spatial structure of a disused railway line in Edinburgh as a walking route. This is a far less ‘structured’ environment to analyse (a ‘diffuse’ setting, to use Norberg-Schulz’s description) than say the streets of the Old Town of Edinburgh – this being type of context within which the tool is demonstrated in Cullen’s literature (see figure 2.3.i together with **plate 2.3**).

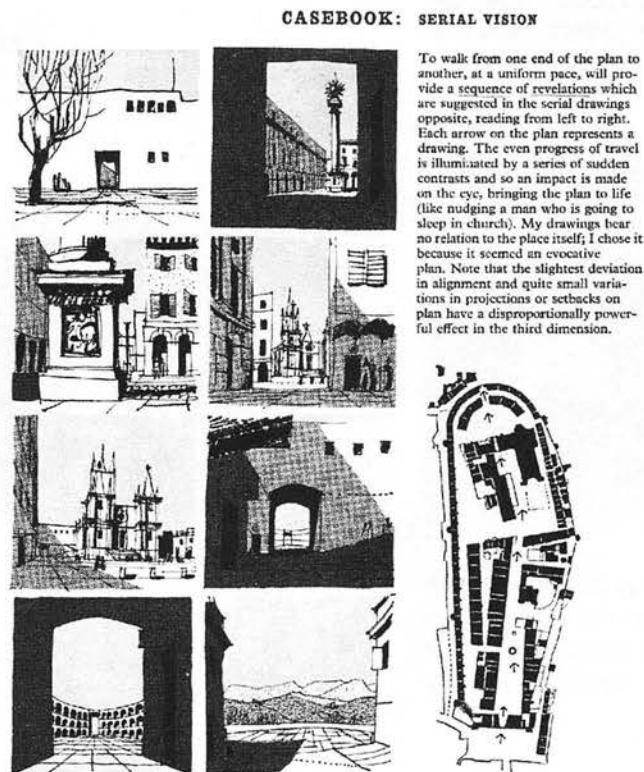
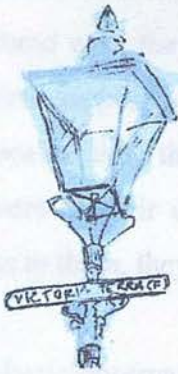


Figure 2.3.i - Cullen’s Casebook: serial vision. (CULLEN, Gordon, 1961, p 17)

The students had been provided with video cameras to record the spatial sequence to play back in the studio as a discussion piece and to provide an added dimension to the exercise. One student instinctively realised that if he played back the entire sequence of walking along the railway route at high speed, the structural sequence which had ‘disintegrated’ at walking speed, suddenly came into being. It is interesting that the fast playback imitates the speed at which a train would have passed through the landscape and so the video camera, in this instance, became a useful interpretive tool helping to visualise how the landscape would have been experienced at train speed. It is also notable that this student had taken a particular interest in Lynch’s ‘View from the Road’ study before going out to analyse the route, whereas in the main, students tended to refer to Cullen.

CONCERNING SERIAL VISION

Serial Vision is a technique that enshrines the 'art of relationship' where all elements that create the environment - the buildings, trees, water, traffic, (including details such as textures, paving, iron-work), combine to release a 'dramatic event'...



"it is the unfolding of a mystery, the sense that as you press on more is revealed."



Plate 2.3 – Using Cullen's 'casebook: serial vision' approach to analyse a walking route through Edinburgh's Old Town area. (The researcher's sketchbook).

Another group of students in the same class had similar problems when analysing the wide streets of Edinburgh's Georgian 'new town'. A number of students struggled to understand what they were supposed to be experiencing when walking along and what they were supposed to be illustrating on paper. Behind the scenes, the tutors admitted that because they themselves had had no trouble in understanding the concept when they were at their own early stages of landscape education, because it had seemed obvious to them, they found it difficult to 'see' what the problem was.

These basic observations highlight three key points: firstly, to the novice designer the concept of 'space' can seem completely illogical; secondly, the emphatic use of Cullen's 'Concise Townscape' in spatial studies exercises does not help students define space in a 'loose' landscape environment as opposed to the 'tight' structure of the European medieval town; and thirdly, the conceptualisation of 'space' is difficult for a studio master to find the words to explain and describe to the novice student, particularly when the concept seems obvious to them. Essentially, there remains 'a problem of space' and the practical application of the theory to explain and describe 'space' *as experienced*, using available tools.

The available visual tools within the landscape designer's repertoire are mainly 2-dimensional and 3-dimensional, although Cullen and Lynch provide a means of capturing the fourth dimension of movement through space. Whether sketching or photographing a spatial sequence it is a way of 'seeing'. Drawing is the key analytical tool since it enables the designer to *really* see. Different forms of drawing, whether mapping, sketching or diagramming help the designer in a 'seeing through doing' approach.

Maps, mapping and drawing in landscape design

Landscape architects rely on maps and mapping to identify form and pattern in the landscape. Mapping is a useful tool in landscape architecture for 'deconstructing' the landscape and the map itself provides the designer with a 'design product'.

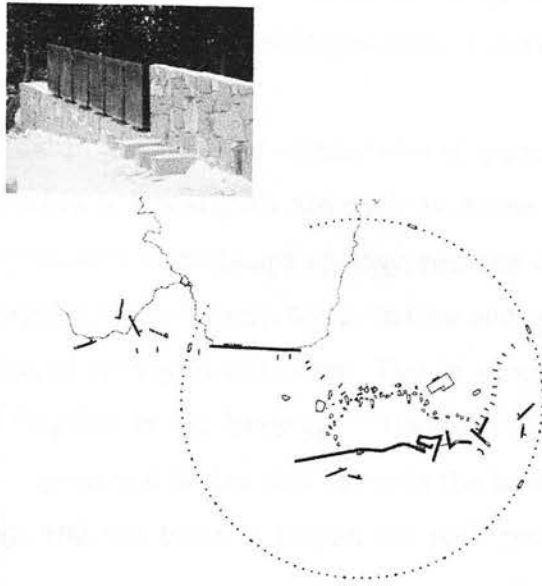


Figure 2.3.ii: Kaivopuisto Park, Helsinki. (VAINIO, Hanna, 1996, p 18)

In this discipline there can be a fine line between analysis and ‘art’ in the mapping process (figures 2.3.ii and iii). Mapping is integral to the information gathering phase where we gain impressions of the landscape, identifying its shapes and forms, and for use in our problem solving process. The mapping process shapes the design process, and helps justify the design ‘end product’. Mapping has also proved an instrumental tool in the development of theory in landscape ecology.

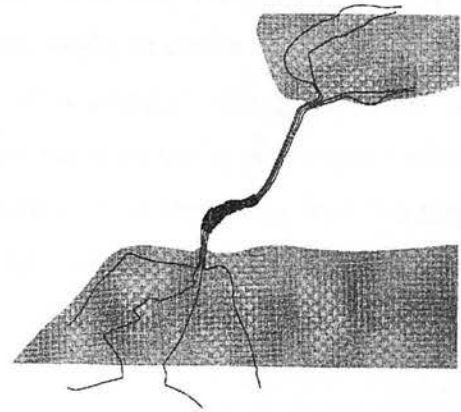


Figure 2.3.iii: Flatlands, Zeeland – from ‘Coastwise Europe’ Exhibition. (DE GRAAF, J, 1995, p103)

Landscape ecology is a relatively new area in which landscape design and ecology overlaps. It emerged as a sub discipline of ecology to understand the spatial relationship of organisms and their environment at the landscape scale.¹¹⁰ Common denominators are ‘space’, the idea of natural process and the concept of ‘region’ in the landscape. The fourth dimension of time and movement is also intrinsic since ‘change’

¹¹⁰ FORMAN, Richard T T and GODRON, Michel, Landscape Ecology. Wiley, New York, 1986

in the landscape is a key feature in the theory. Mapping is an important tool in ecology because it helps visualise the dynamic processes at work.

Ecology is a dynamic process of interactivity of organisms with the environment and mapping identifies a landscape's structure in terms of the forces which create it. Forman, a key theorist in landscape ecology, presents a 'patch prototype theory' which is a way of mapping these dynamic forces in time and space. It emphasises patch shape, rather than size, as the significant factor. This he states is because shape is an indicator of form and function in the landscape. Forman suggests that we can map a set of common and uncommon shapes that occur in the landscape, classify them as discrete units of study, and use them to predict the past, present and future changes in the landscape.

Another significant principle of landscape ecology relevant to the mapping process, is the grain concept: the closer the grain, the more complex the landscape becomes. A fine grain landscape has mostly small patches, whilst a coarse grain landscape has mainly large patches. Grain is a concept which works in conjunction with scale, but whereas scale refers to the spatial proportion of a mapped area, grain refers to the coarseness of elements within the area.¹¹¹ In turn, the scale of the landscape is related to its overall mosaic pattern that exists in a hierarchical land structure - from the scale of the planet, to the continent, a regional, a landscape to a local ecosystem, as illustrated in figure 2.3.iv below.

Whereas the mosaic refers to a landscape's overall structure, grain refers to the patch content, whose contents in turn take on a pattern of their own. At this scale the internal habitat diversity determines its patch characteristics. The mapping process is traditionally used to distinguish these constituent shapes and their contents in their 2-dimensional form. However, Forman proposes the third dimension (which he terms the 'vertical' dimension) is also critical to identifying landscape structure and dynamics, in particular its topography and vegetation. In this dimension, mapping and drawing become combined. It is notable that in this dimension Forman introduces the human element.

¹¹¹ FORMAN, Richard, T T, Land Mosaics. The ecology of landscapes and regions. Cambridge University Press, UK, 1995

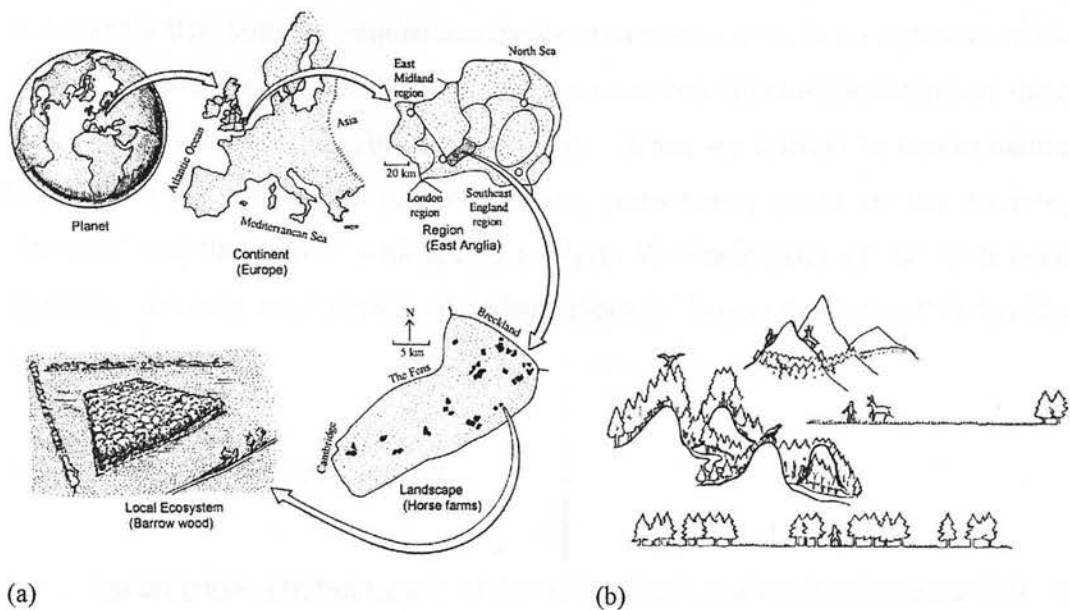


Figure 2.3.iv – The use of mapping and drawing in landscape ecology: (a) Mapping a spatial hierarchy on land. (FORMAN, R, T, T, 1995, p 12); (b) Introducing the third dimension to landscape ecology. (FORMAN, R, T, T, 1995, p 303)

Mapping is a form of drawing. As Carlo Scarpa once said, ‘I draw so I can see.’¹¹² In landscape architecture the *act* of mapping as a drawing tool enables the designer to ‘see’ not only what is visible to the naked eye, but also those underlying structures that we know exist from maps, or other sources of information. This is what Hough would describe as ‘invisible forces’ in the landscape. This thesis suggests these can equally relate to environment-behaviour patterns in the landscape – a point which will be returned to later.

In his volume entitled ‘The elements of drawing’, published in 1857, Ruskin inferred that drawing is more about ‘seeing’ than about what you can actually draw.¹¹³ Sullivan also describes drawing as a ‘seeing’ tool, and on its use in the landscape he writes:

“Landscape drawing is not the reproduction of nature. It is an expression of the emotions, sensations, and feelings that the landscape impresses on the artist. It is the creation of atmosphere and space.

Drawing the landscape allows you to visualise it in a new way. As opposed to taking a photograph, drawing the same landscape enables you to really understand it. There is something unique about the hand-eye relationship as you record a subject through drawing. Drawing links your visual perceptions to your subconscious. The photographed image preserves the visual event, but drawing entails the experience of looking: we stop and become part of the subject and its time. Strive toward eliminating the separation between you and the image.”¹¹⁴

¹¹² paraphrased in SULLIVAN, Chip, *Drawing the Landscape*, Van Nostrand Reinhold, USA, 1995, p 2

¹¹³ DE BOTTON, Alain, “The Independent on Sunday: A book in the life of” review of RUSKIN, John, *The Elements of Drawing* (1857), 9 April 2000

¹¹⁴ op cit, SULLIVAN, Chip, 1995, p 8

It is notable that Sullivan emphasises the need to ensure there is no separation between observer and landscape. On the one hand we need this direct engagement, on the other hand this emphasises the subjective response. When we attempt to conceptualise the landscape from the user's perspective and particularly, when we try to integrate 'function' and 'behaviour' with spatial analysis, the inadequacy of our tools becomes apparent. From a brief review of recent issues of *Topos* magazine this inadequacy reveals itself.

Form, function and behaviour

Topos has an important, but largely under utilised role as a feedback mechanism. It has the potential to highlight where designs fail to adequately address the needs of users, and why. This thesis suggests that this is largely due to a lack of robust critical frameworks for evaluating design performance.

Certain articles have appeared in the journal in recent years, indicating how the problem (which is known as 'the applicability gap' in the research sphere), appears in the real world of landscape design, between design inception and design implementation on the ground, embedded in the complexities of the planning and design process in which many different people participate.

Three articles will be briefly analysed on:

1) Schouwburgplein, Rotterdam; 2) the planning process; and 3) public consultation.

2.3.1 Schouwburgplein, Rotterdam

Progressive design journals give a good deal of exposure to competition winning entries and new build projects. These are hailed as 'good' designs often based on an abstract set of criteria, reinforced by photographs of pristine and often unused landscapes. *Topos* originally published an article on Rotterdam's much acclaimed winning design 'Schouwburgplein' which Adriaan Geuze had designed as 'a stage' on which all kinds of people could meet, in 1997 in an



Figure 2.3.1: Rotterdam Schouwburgplein. (ROUSSEAU, Sophie, December 2000, p 19)

issue dedicated to lighting (Issue no 20, 'Nightscape'). In this article the newly completed square was presented in terms of its stated intention – an empty space that was to serve as a stage 'from which the Rotterdamers can admire their city'. The lighting was designed to adapt to its various potential activities, and its coin-operated movable masts were a key design feature. The article suggested that a good square should be able to function as a stage, and that because 'no one can predict exactly how this square will be used', suggested that stimuli (the lighting) can incite certain activities.¹¹⁵

The square appeared again in *Topos* in December 2000 in a critique of the design as an urban square.¹¹⁶ (See figure 2.3.1). Geuze's original design statement was quoted where he predicted that "the customers of the surrounding shops, the employees of the nearby offices, young people, children, the residents of the district and the people going to the movies"¹¹⁷ would all congregate here. But, the article emphasises, these conjectural predictions never came true, and the reality is people only gather on the square for organised events, and nothing else.

The problem, according to the author of the article, is that this square was a highly prestigious showpiece project and a product of the city's marketing strategy, and so more of an image than a square. Thus, in one sense it has served its purpose, but as a public square it is 'a place of emptiness'. But then, this was how it had appeared in the competition images before it was built and furthermore the author concedes that it has a kind of 'beautiful emptiness'.

The problem is the square is now a reality and the city planners will have to spend a lot of money in maintaining the look of the square to justify all the money invested in it in the first instance. But more than this, it presents a confusing set of criteria about what constitutes a 'good' public square. On the one hand, this is a public square that does not 'work', and on the other hand, set within the context of the original design intention, its design has been implemented accordingly. It is notable that this project also appears in Gehl and Gemzoe's presentation of 39 public spaces selected for 'winning back' public space, and for their design quality. This presents a conflicting

¹¹⁵ BRUMMEL, Klazien, "Schouwburgplein, Rotterdam – the city's podium", *Topos*, no 20, Sept 1997, pp 55-61

¹¹⁶ ROUSSEAU, Sophie, "Schouwburgplein: more of an image than a square?", *Topos*, no 33, December 2000, pp 18-24

¹¹⁷ *ibid*, p18

message, particularly to the student designer who would associate Gehl's name with public spaces that are well used by humans.

In Gehl/Gemzoe's publication, Schouwburgplein is presented as 'a refreshing example of a radical interpretation of city space'¹¹⁸ But, ultimately this is a public space that is being preserved to retain its 'empty beauty'. Whilst conflicting messages about this design's performance appear in design oriented publications, concrete lessons in terms of its behavioural performance will likely emerge in an environment-behaviour research thesis somewhere whose findings might be published in an academic journal which designers do not read, by which time designers will be looking at a new competition winning design for inspiration and guidance as to what constitutes 'good' design.

2.3.2 The planning process

In another article, the problematic issue of public space designs not functioning as



Figure 2.3.2: Formal design ideas do not always coincide with users' needs: a green space in Brasilia. (BRANDS, Bart, LOEFF, Karel, September 2002, p 61)

intended when translated into reality, was highlighted (see figure 2.3.2).¹¹⁹ The authors of this article note that this has generated debates about the very nature of public space and whether it is any longer valid. But this seems to simply justify the existence of all the failed empty spaces of no use to anyone. Rather, the authors consider 'the problem' as related more to the lack of flexibility in the planning process.

The authors of the article describe how instant results are expected (talking in general terms about planning), about how there is a lack of flexibility in the process, and how designs are 'fixed' before work has even begun on the ground. This, the article suggests goes against sustainability principles, and is a process

which fails to allow for adaptation and change. They suggest the need for a new

¹¹⁸ GEHL, Jan, and GEMZØE, Lars, *New City Spaces*. The Danish Architectural Press and The Royal Danish Academy of Fine Arts School of Architecture Publishers, Copenhagen, 2001, p116.

¹¹⁹ BRANDS, Bart, LOEFF, Karel, "Beyond Aesthetics", *Topos*, no 40, September 2002,

strategy in design, execution and management where instead of determining everything at the design stage, consideration should be given to postponing some decisions on a design's implementation. Finally the authors declare: "Designing does not mean providing answers to fixed conditions, but should be a search for questions..."¹²⁰

2.3.3 Public consultation

Finally, an article appeared which discussed the use of public consultation in the planning process for a public space programme in London.¹²¹ The article describes how J&L Gibbons landscape architects entered into a public consultation process for the Pool of London Partnership as part of the 'Public Spaces Framework' prepared for the London borough of Southwark¹²². Here, Johanna Gibbons highlighted the key difficulty being that "Design has to respond to consultation and facilitate other people's ideas, but not be compromised by it....it has to survive the consultation process"¹²³. She highlighted the difficulties of 'consultation fatigue' from the community who had been consulted several times but had never seen any results. In particular she stressed the need to adopt different approaches for different people. Figure 2.3.3 illustrates the most common type of communication used in the consultation process in the form of words and photographs.

The problem, or rather the challenge for the designer, as highlighted by the article, is to retain design integrity, and yet satisfy everybody's diverse needs and concerns. Although not mentioned in the article, it is notable that alternative methods such as Space Syntax are now becoming increasingly used as complementary tools to the consultation process in regeneration programmes such as this, for providing an 'evidence-based' approach to design. Later in the thesis, it is suggested that the landscape architect too can have an input in this capacity.

¹²⁰ op cit, BRANDS, Bart, LOEFF, Karel, September 2002, p 64

¹²¹ HENZE, Eva, "Enlightened South London", *Topos*, no 34 March 2001, pp 78-84

¹²² *ibid*

¹²³ *ibid*, p 81

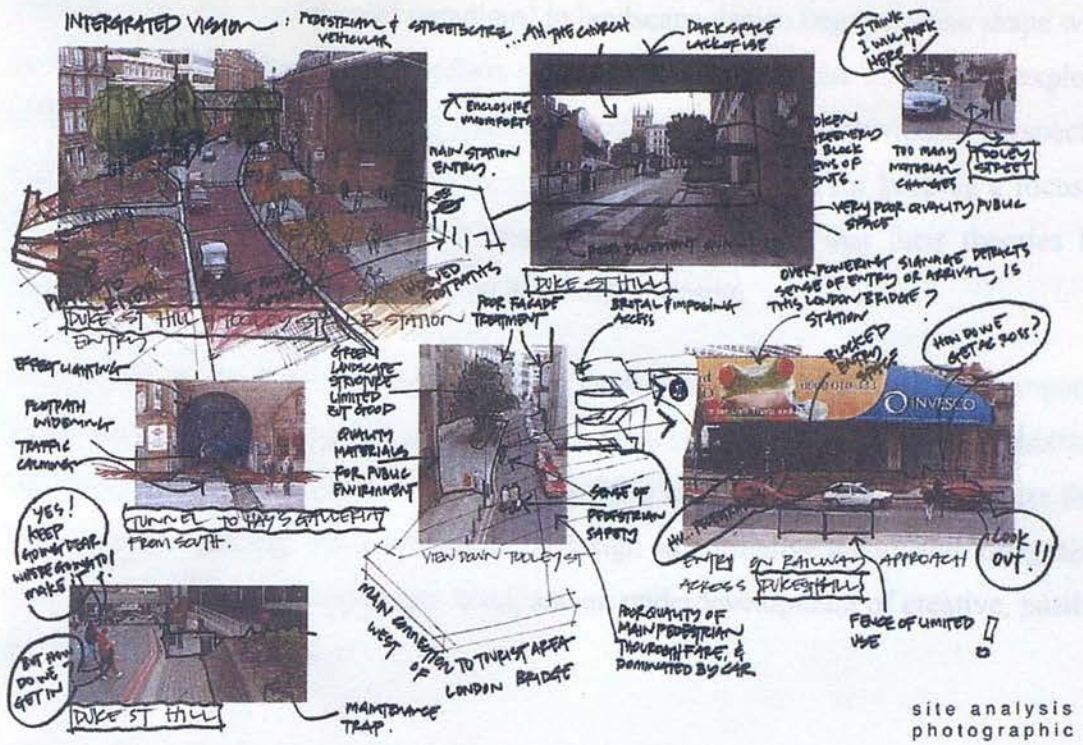


Figure 2.3.3- Pool of London Partnership Public Spaces Framework strategy. (HENZE, Eva, March 2001, p 80).

The above three articles add some perspective to the problem under investigation. These examples highlight the difficulty in ‘locating’ the problem in real world practice, and therefore of ‘naming and framing’ it. From the perspective of mainstream designers who are engaged in the pragmatic aspects of everyday practice, there is no clear cut link between a limitation in the theory and real world design. Therefore if a new theoretical link is to be conceptualised in the form of some kind of experiential theory, the significance of the experiential paradigm and its link with the gap problem needs to be clarified, and the potential usefulness of the theory in practice, be further explored. The next chapter will attempt this.

2.4 SUMMARY

This chapter explored landscape design theory over its evolutionary history. Key shifts in thinking were attributed to theories that, at different times, introduced a social perspective and new concepts of space. ‘Space’ was identified as the central theme of the theory base, and spatial analysis as the key ‘form-giving’ design activity in place-making. A significant shift that occurred in landscape architectural thinking was highlighted when the conceptualisation of landscape as a static, scenographic ‘picture’, came to be considered a dynamic, unifying medium, in which people played a key role.

Subsequently, the 'experiential paradigm' in landscape design began to take shape when certain pioneering designer-researchers such as Lynch, Alexander and Cullen explored new approaches to place-making which embodied the social-behavioural perspective *within* spatial analysis. These designer-researchers were noted for keeping a focus on the usefulness of their research to designers, thus ensuring that their theories had practical relevance in the visual-spatial approach to design.

An overall lack of clarification of the 'experiential paradigm' in contemporary landscape design thinking was identified. The weakness in the theory was attributed to the theory generating process itself, in which there is disengagement of designers from formal theory building. An over reliance in design on normative theory and 'imageable' concepts was identified on the one hand, and an underdevelopment of creative, positive theory building on the other.

The significance of Patrick Geddes' evolutionary philosophy to theory building was emphasised. Geddes' holistic and inter-relational approach, in which theoretical and practical 'doing' became interlinked, was highlighted as the philosophical foundation out of which the social theme first became established in the town planning movement. It was noted that Geddes started from a biological basis, rejecting the traditional academic 'book' approach, convinced that new knowledge could not be gained without new methods. This entailed a return to fundamentals in order to become self-conscious at a deeper level towards finding a 'path' towards new kinds of knowledge, and for this his 'thinking machine' was emphasised as being instrumental to his thinking.

A weakness in landscape design theory was linked to a 'tension' between cultural, biological and perceptual approaches to landscape study, which in turn is compounded by a conflict between the professional and public perception of the landscape. Normative 'aesthetic' ideologies of the world preside over what constitutes 'good' design as circulated in progressive design journals. The socio-behavioural perspective remains ineffective largely as a consequence of the lack of engagement of designers in positive theory generation. As a result there is a lack of development of conceptual structures that order, explain and predict the human experience of place.

Conclusion

The experiential paradigm should be further explored for its potential role in positive theory building towards linking aesthetic, cultural, biological, and perceptual perspectives. The role of the paradigm should be explored for its ability to provide a theoretical structure for ordering, explaining and predicting the human experience of place, in an approach which embodies the social-behavioural perspective *within* the visual-spatial approach.

Chapter 3:

THE POTENTIAL OF THE THEORY

3.1 INTRODUCTION

In this chapter the experiential paradigm is explored as a potential area for generating theory towards bridging the behavioural science/design gap.

The existence of an experiential paradigm in research is identified and compared with how the paradigm in *design* is currently taking shape. Theoretical development is critically reviewed in relation to principles of thought on aesthetic, biological, cultural and perceptual issues.

3.2 THE EXPERIENTIAL PARADIGM

In a research sphere, the experiential paradigm is an identified area of landscape assessment and perception research methods. The focus is not on human or landscape components but on 'the experience of their interaction'¹. Thus, researchers using experiential methods focus on understanding the nature of the interaction, and not on a landscape's particular features. Central to the approach is the understanding that people are not passive observers but are active participants.

The experiential paradigm offers researchers a 'design-like' approach in the sense that it explores the landscape experience phenomenologically or through art and literature. Techniques in the experiential approach are not as structured as other paradigms, but this is deliberate.² The general purpose in adopting this approach in landscape perception is to arrive at a definition of landscape 'value' where it is defined by criteria used by the individuals experiencing that landscape, not by the experts studying it, although there is also an admission of the importance of the subjective element:

"The primary approach is to elicit descriptions of personal experience as it happens, without attempting to be analytical, and to avoid preconceived notions

¹ BECHTEL, Robert B, Robert W Marans, and William Michelson, eds, Methods in environmental and behavioral research. Van Nostrand Reinhold, New York, 1987

² op cit, BECHTEL, Robert B, et al, 1987

that may distort the basic experience. Reflection on that experience can present insights that contribute to understanding. Naturally, a person can rely on his own experience as raw material, but more insights are possible if a group of people can share their experiences.”³

In the design sphere, the experiential approach seems to loosely combine ‘biological’, ‘socio-psychological’, ‘environmental’, ‘cultural’, ‘aesthetic’ perspectives, according to a designer’s personal approach. However, there exist certain theories on the ‘experience’ of landscape which when consolidated and clarified, may provide a more substantial foundation for the experiential approach to design than has been suggested so far.

The experience of landscape

The linkage between the generation of design theories and scientific knowledge has not received adequate attention by researchers.⁴ In the history of landscape theory, experiential approaches were explored by the pioneer designer-researchers Cullen and Lynch. Later, Michael Hough emphasised the intimacy of the human/landscape relationship in producing the vernacular landscape, and more recently James Corner has discussed the landscape as an actual lived medium, which is ‘all-enveloping’, and a ‘highly situated’ network of relationships and associations in ‘a great experiential quarry’.⁵

To some, the need to conceptualise an ‘experiential approach’ to landscape design might appear a statement of the obvious or something that each individual designer should be doing themselves anyway. However, in “the swampy lowlands of messy ambiguity”⁶ that constitutes the world of professional practice, in which the landscape architect must contend with the public’s view of the landscape and their misconception of what landscape architecture entails and what ‘the landscape’ actually is, the obvious should not be taken for granted.

³ op cit, BECHTEL, Robert B, et al, 1987, p 385

⁴ SANCAR, Fahriye Hazer, “Behavioural knowledge integration in the design studio: an experimental evaluation of three strategies”, Design Studies, Vol 17, Issue 2, April 1996, pp 161

⁵ CORNER, James, “Representation and Landscape” (1992), in SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader*. University of Pennsylvania Press, USA, 2002

⁶ paraphrasing SCHÖN in: PIANTANIDA, Maria et al, “Claiming Grounded Theory for Practice-based Dissertation Research. A Think Piece”, University of Pittsburgh, Pennsylvania, Proceedings 2002 Conference on Interdisciplinary Qualitative Studies, Roundtable Discussion, January 3-5, 2002, Athens, Georgia, page 2

The experiential perspective provided by Tuan states that place and space cannot exist without each other and that it is our 'bodily' spatial experience that transforms spaces into places.⁷ Significantly, Tuan highlights that people tend to suppress that which they cannot express and an experience resists 'ready communication'. As a consequence, finding ways in which to take into account the different modes of experience and to interpret space and place as images of complex and often ambivalent feelings, is problematic.

Jay Appleton did much to develop the concept of the experiential landscape⁸. He generated discussion on how evolutionary theory explains our environmental preferences towards certain types of landscape settings. These are ones that 'afford' us with what we need as primitive beings and this affects human visual perception and experience of the landscape in modern day living, because these are hereditary traits of our ancestral past. The concept of affordance as theorised by J J Gibson, states that humans select ecologically significant information from the environment that is important to their survival and as a consequence (in the context of landscape perception) Appleton and other psycho-evolutionary researchers, such as Bourrassa⁹, base their arguments on the fact that because most of human existence has been in a savanna or parklike habitat this is what we prefer. It was out of this theoretical grounding, that 'prospect-refuge' theory emerged.

Appleton's approach is influential to this PhD thesis: firstly, he advocates the importance of generating debate as the initial step towards generating theory versus the gaining of 'statistically acceptable proof'; and secondly Appleton's exploration of theory took a serious view to its usefulness.

The utility of the experiential approach

The potential use of the experiential approach to landscape design was recognised more recently by Catherine Dee in her recent publication 'Form and Fabric in Landscape Architecture'¹⁰ where she uses it as an interpretive framework. In this book Dee presents her own design model within which the experiential approach is embodied. Hers is a highly visual approach (which she terms 'visual-spatial') which she has

⁷ TUAN, Y, F, Space and Place. The Perspective of Experience. Edward Arnold Publishers Ltd, London, 1977

⁸ APPLETON, Jay, The Experience of Landscape. Revised Edition, John Wiley & Sons, England, 1996 [and 1975]

⁹ BOURASSA, Steven, C, The Aesthetics of Landscape. Belhaven Press, London, 1991

¹⁰ DEE, Catherine, Form and Fabric in Landscape Architecture. A visual introduction. Spon Press, London and New York 2001

published with an intention to ‘encourage designers to make connections between experience and design’ (figure 3.2).

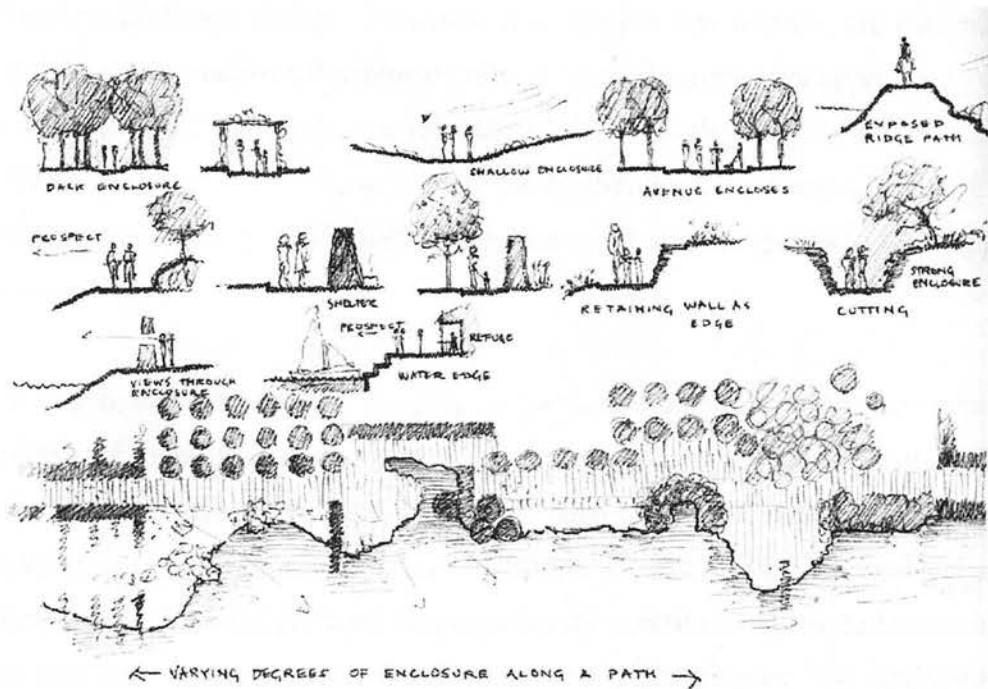


Figure 3.2 - Catherine Dee's visual-spatial exploration of the experience of walking along a path. (DEE, Catherine, 2001, p 92)

Dee defines the experiential approach as ‘the human experience of landscape that helps to shape both the concepts in the book and an understanding of design’. She stresses the morphology of landscape *as experienced*, stating that the spatial and physical ideas in the book are based on her own experiences of landscape whilst “moving through it, stopping, looking, feeling, touching, talking, eating, sheltering, remembering.”¹¹ She states that her ideas are also strongly informed by a wide range of design theorists concerned with the human experience of the use of places, referring the reader to the bibliography where she highlights which books *most* informed her approach. Lynch, Alexander and Gehl and Jay Appleton appear in this list.

In one sense Dee's ‘Form and Fabric’ publication appears to present nothing new. However, as with the landscape itself, this depends on how it is interpreted. ‘Images’ can be read in any way chosen and read in the context of the interpretive framework that Dee's experiential approach provides, or not. Her work may be viewed as a theoretical study which embodies the landscape experience within her ‘morphological’ approach

¹¹ op cit, DEE, Catherine, 2001, p 2

(the 'form and fabric' of the title), or as a highly subjective and personal 'sketch book'. By the former interpretation, Dee's work combines visual and verbal language and effectively provides an incremental step towards 'concretising'¹² the experiential approach to landscape design. However, it is notable that whereas the current thesis attempts to conceptualise a theoretical 'vehicle' for an experiential approach to design, Dee uses the visual approach as a vehicle in itself. In other words, this thesis places greater emphasis on the thinking process for facilitating a new way of looking at the landscape, seeking a more objective departure point for design than Dee's approach suggests.

There is a flow in mainstream thinking in landscape architecture towards generating new ways of looking at the landscape for its 'experiential' qualities, rather than its 'scenographic' qualities. This is linked to the need to shift the public perception away from the traditional pastoral image of landscape. In the process, critical debate has entailed the use of *verbal* (written) language but the contributors have had to retain sight of the fact that landscape architects predominantly communicate 'the landscape' in a *visual* way. These two aspects of 'the language of landscape' will now be considered.

3.3 THE LANGUAGE OF LANDSCAPE

Anne Whiston Spurr, John Dixon Hunt and others have written about the intimate link between the landscape and our spoken language and how humans 'read' the landscape. James Corner suggests the landscape is itself a text open to interpretation, which, as a cultural phenomenon, becomes 'encoded' by the spoken word or through literature, poetry, myths and paintings. Some thirty years ago Lynch suggested that we also encode the landscape in our behaviour. It is in this way that meaning becomes filtered according to different mental schemata, or representations of 'landscape'. Firstly, verbal representations of the landscape will be explored, followed by the visual.

3.3.1 Verbalising the landscape

Contemporary writing can reveal as much about the current state of thinking in the profession by what it says, as by what it does not say. In his critical review of Corner's anthology of essays 'Recovering Landscape' Jory Johnson believes that the

¹² (term borrowed from Norberg-Schulz)

anthology put together by Corner conceptualises the landscape at a level of abstractness that appears to exclude people. He asks "...where are the clients, users, inhabitants, and past inhabitants?"¹³ He states that in the anthology, Corner and the other writers produce concepts that derive from texts, images and a multitude of other references, but not, seemingly, directly from people. On analysis of Corner's own writing, although his choice of words does not directly derive from 'people' the words demonstrate a sensitivity to the human landscape as it operates in reality –where 'people' are *inextricably linked* to the landscape in one way or another.

Corner, and Appleton before him, describe an old German term 'landschaft' that emphasizes the experiential aspect of the landscape, that is, the "intimacies of engagement, participation, and use over time..."¹⁴; Appleton translated the concept as 'the region' but according to Corner the *true*, original concept of landscape was an 'occupied milieu'¹⁵ structured out of intimate use and 'habit of time'. Although people today do not actually operate in the abstract from the landscape, but because the collective public experience of the landscape is predominantly urban based and people are not tied in with 'working the fields', and because the public perception does not see the urban environment as 'landscape', the public perception of it is limited to a pastoral view from afar.

Interlinked with the problem of public perception Corner suggests landscape architects still 'see' the landscape as if 'master viewer'. Corner's reference to this recalls to mind Tuan's description of the 'vertical view' (as compared with the 'side view'). Tuan distinguished the side view, in which the person is *in* the landscape, engaged with it in some activity, from the vertical view which sees the landscape from an abstract point 'above'.

Corner urges a move towards developing new ways of conceptualising and representing the landscape that are more about capturing the collective sense of place. In contemporary living, this is predominantly urban-based and linked to our everyday living and working habits. In Corner's search for a new view, he asks:

¹³ JOHNSON, Jory (reviewer – 'Recovering Landscape: Essays in Contemporary Landscape Architecture', ed James Corner, 1999), *Landscape Architecture*, vol 90, no 1, January 2000, p 70

¹⁴ CORNER, James, "Eidetic Operations and New Landscapes", *Recovering Landscape. Essays in Contemporary Landscape Architecture*. Princeton Architectural Press, USA, 1999, p 158

¹⁵ *ibid*

"...given the obvious limits of landscape as representation, not to mention the pathetic failing of most of what passes as landscaping today, is it possible to realign the landscape architectural project toward the productive and **participatory** phenomenon of the everyday, working landscape? By this I mean to suggest a return neither to agrarian existence nor to functionalist practices but rather to emphasize the **experiential** intimacies of **engagement**, **participation**, and use over time, and to place geometrical and formal concerns in the service of human economy. In this sense, the city is as much a **participatory** landscape as are the highly technological energy and agricultural fields..., the worked plots of private gardens, and the **activities** circulating across vast urban surfaces."¹⁶

By using the words 'participatory', 'experiential', 'engagement' and 'activities' Corner is invoking ideas related to the human-environment experience. By avoiding the words 'people' and 'user' he is focussing neither on place, nor people, but on the interaction of the two. This is the experiential aspect of landscape design.

Corner talks of the difference between landscape as 'verb' as opposed to 'noun' urging landscape architects to seek out the 'yet to be discovered' applications of 'the landscape', and explore its potential as an 'active instrument' for change. He identifies the potential to change modern conceptualisations of the landscape through the process of 'imaging'. By 'imaging' Corner refers to the mental construction of the landscape as much as the graphical construction of the landscape through the use of images. The way in which landscape architects visually interpret and represent the landscape will now be discussed.

3.3.2 Visualising the landscape

Despite the variety of styles and individual approaches to landscape design, there are certain generic visual techniques that create a kind of collective visual language in landscape architecture. However, as professional boundaries dissolve and projects become collaborative ventures with architects, who in turn have begun to think in larger scale terms than the individual building, landscape architects, architects and urban designers can be indistinguishable from each other in the pages of design journals. However, it is often the case that the landscape architect is distinguishable from the architect by the emphasis on context, maps and mapping.

Inbuilt into our 'master view', the Lynch model can be seen at work. In the design process the Lynch model is discernible as a background 'facilitating' theory for developing landscape strategies for design. For example a typical strategic approach to

¹⁶ *ibid*, CORNER, James, (Ed), 1999, p 159

a large scale area is to categorise it into routes, and districts and so on. This helps identify its form and structure and to generally make sense of the landscape. There are variations of the basic Lynch model, notably, Dee who, taking 'space' as the basic unit for analysis in the landscape, thinks in terms of *paths, edges, foci, thresholds and detail*.

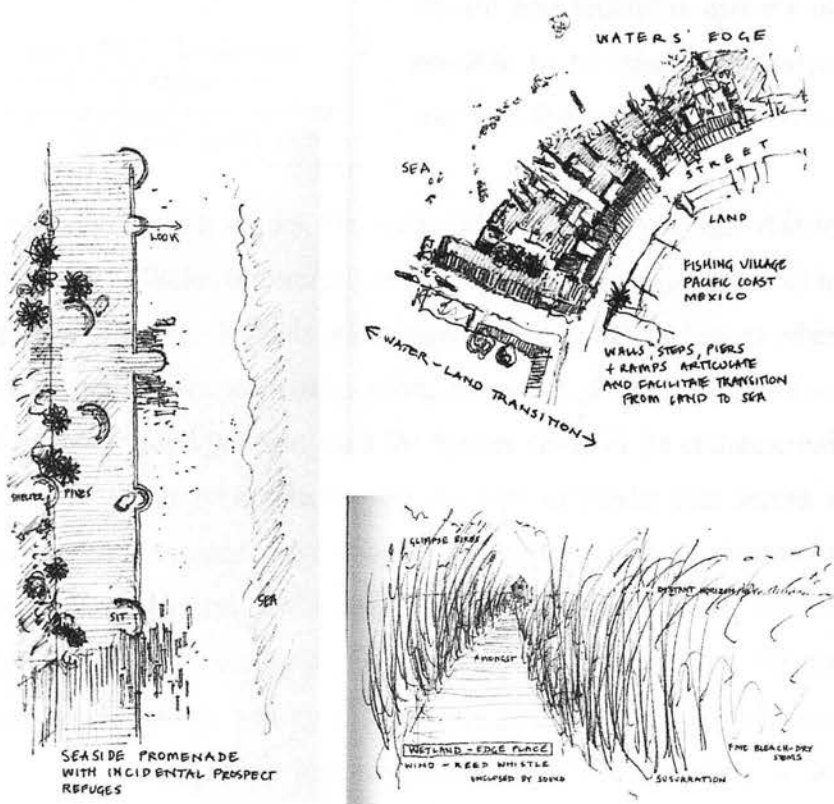


Figure 3.3.2.i - Edges in the landscape in different dimensions and at different scales. (DEE, Catherine, 2001 pp 141-143).

Dee provides a variation of the Lynch model that is more appropriate for non-city landscapes, or at least, the more 'loose' landscape setting than tightly bounded street settings provide. Most notably she introduces 'detail' to an overall model which emphasises the spatial structure of the landscape, in terms of content and form. Dee's model appears to allow for more freedom of movement between looking at the general configuration of the landscape on the one hand (its form), and a more *detailed* focused look at the other extreme (its content).



Figure 3.3.2.ii - The dynamic shaping of movement - 'a continuous experience over time'. (LYNCH, K, 1960, p 98)

Design is not art. The main distinguishing feature of design across all disciplines, is the concept of utility. In landscape architecture this entails the spatial organisation of outdoor places to meet human needs and desires. The skill in design is to reconcile the artistic and technical aspects of the process. It is possible to be 'usefully' analytic but in an artistic way, and this was Lynch's particular forte.

The classic Lynch model, (ie, path/ edge/ landmark/ node/ district), as with all good models in all fields of interest, enables designers (in this instance) to make sense of very complex systems. Models are frequently used in the sciences where they have a use as 'a schematic description of a system, theory, or phenomenon that accounts for its known or inferred properties and used for further study of its characteristics'.¹⁷ This type of model is not to be confused with the type of model that serves as an example to be imitated or compared, for example 'a model new town'. Lynch (or Dee's) model may be considered more of the 'scientific' variety in that it serves the purpose of aiding discovery and providing explanation, or as per Forman's definition of a model for landscape ecology, which is the means by which "a complex system is simplified by filtering out apparently less important variables. As such, it does not describe the complexity of any real landscape."¹⁸

Lynch's model provides a *useful*, and *usable*, form of knowledge because, firstly, it explains a real world phenomenon (a generic mental model of the city) and secondly, it provides a framework for analysis that the designer can integrate with the design process. It is notable that R. Riley, a prominent critic of attempts to develop theory within landscape architecture, argues for a clearer distinction between theory, models, and frameworks.^{19, 20} He advocates that the term *theory* should be restricted to knowledge that *explains* some real-world phenomenon whereas *models* should be used to *predict*, and that *frameworks* describe the ideas which *link* landscape architecture to other disciplines and broader society. It is, however, arguable that such clear-cut

¹⁷ OXFORD DICTIONARY, (The Concise), 6th Edition, Oxford University Press, Oxford, 1964, 1976

¹⁸ FORMAN, Richard, T T, Land Mosaics. The ecology of landscapes and regions. Cambridge University Press, UK, 1995, p 437

¹⁹ SWAFFIELD, S, (Ed) Theory in Landscape Architecture. A Reader. University of Pennsylvania Press, USA, 2002

²⁰ RILEY, R, Editorial Commentary: "Some Thoughts on Scholarship and Publication", *Landscape Journal* 9, no 1, 1990

distinctions are not helpful to the development of landscape architectural theory. Elizabeth Meyer, also a critic of modern landscape theory, provides a slightly different viewpoint on the nature and role of theory in the discipline. She suggests that theory should 'bridge', 'mediate', and 'reconcile' as follows: firstly, she emphasises the need to link, or 'bridge', with familiar categories 'from within', in order to facilitate design discourse and criticism. Secondly she states that as a 'mediating' device, landscape theory should be an 'activity' for constructing new theory through design itself; and thirdly theory should 'reconcile', that is join or making compatible, two different pieces of work.²¹

As regards the role of the Lynch model in landscape design, its utility might be considered in terms of its ability to bridge 'with familiar categories from within' together with its role as 'an activity'.

The utility of the Lynch model

The Lynch model (and potentially the Dee model) as used in landscape design, is essentially a 'thinking/doing' tool. This is important to the landscape architect for spatial analysis where our visual-spatial thinking process is infused with the drawing process.

Lynch's theory of imageability became embodied in his path/ edge/ landmark/ node/ district 'image of the city', thus providing an *external* representation of the general public's *internalised* image of place. In the design process the Lynch model helps 'categorise' environmental information, as derived through site based spatial analysis, into a manageable form, which in landscape design, tends to be in imageable map form. The model thus *facilitates* the place-making process which relies on the imaging faculties built into human cognition, (or visual thinking,); it helps the designer externalise 'the image'; and it provides an 'information processor' for design.

Kenneth Boulding's theory of 'Eiconics', formulated in the mid 1950s, stated that all conceptual knowledge is organically related to the image²². On the environment, his theory was that raw environmental data is filtered through levels of interpretation and acceptance, and our sense of external reality is determined by feedback from others

²¹ MEYER, Elizabeth 'Situating modern landscape Architecture', (1992) in: SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader*. University of Pennsylvania Press, USA, 2002

²² BARRY, Anne Marie Seward, *Visual Intelligence. Perception, Image and Manipulation in Visual Communication*. State University of New York Press, Albany, USA, 1997

viewing the same situations: in this way we continually adjust our generic world image. It is notable that when Boulding first described the Image he conceived of it as

"a great mental gestalt, subject to all the principles that the Gestalt psychologists outlined: simplicity, regularity, efficiency, good continuation."²³

Every human being, including scientists, artists and designers, interprets the world around and within him by making images²⁴. To do this we need 'perceivable models' that enable us to construct images in our minds:

"Unless an image is organised in forms so simple and so clearly related to each other that the mind can grasp them, it remains an incomprehensible, particular case. Only through the generalities in its appearance is the imaged thing seen as a kind of thing and thus made understandable."²⁵

In accordance with Arnheim's criteria, Lynch's model appears to serve the purpose as 'information processor' very well: it is simple, all parts relate to the whole, it is generalised and understandable. Furthermore, it has imageability and this helps the landscape architect's *internal* design process and the *external* process of visual communication to others.

The internal/external relationship humans have with their environment, and its relevance and use to environmental designers, has been the subject of debate by a number of writers. This leads the current investigation into a new area in which the use of spatial cognition in the design process for the purpose of information processing and knowledge generation (in the experiential paradigm), is explored.

3.4 SPATIAL COGNITION, INFORMATION PROCESSING AND KNOWLEDGE GENERATION (FOR DESIGN)

In the 1970s Downs & Stea put together a collection of papers exploring the relationship between the 'internal' image making process and the 'external' environment.²⁶ They were the first to suggest that the cognitive map is both a thing, or noun ('product') and an act ('process').²⁷ Downs and Stea described cognitive mapping as a process that enables humans to mentally represent the environment in order to know where one is, which in turn enables one to find one's way about. They described

²³ op cit, BARRY, Anne Marie Seward, 1997, p 102

²⁴ ARNHEIM, Rudolf, Visual Thinking, University of California Press, USA 1969

²⁵ op cit, ARNHEIM, Rudolf, 1969, p 274

²⁶ DOWNS, Roger, M and STEA, David, Image and Environment. Cognitive Mapping and Spatial Behaviour. Aldine Publishing Company, Chicago, 1973

²⁷ PASSINI, R. Wayfinding in Architecture. Van Nostrand Reinhold, New York, 1992

how humans are able to collect, organise, store, recall and manipulate information about the spatial environment.

Downs and Stea attempted to set out an interdisciplinary framework for the study of cognitive mapping as the spatial aspect of general human cognition. They highlighted the intimate relationship between internal and external space, as demonstrated in the way that humans make sense of most aspects of their lives using spatial metaphors – for example we can be close or distant in our friendships, we are either ‘inside’ or ‘outside’, ‘here’ or ‘there’. The book highlighted that spatial cognition comes into play not only in the practical activity of navigation through space in the real world, but in the navigation of our internal space *for the purpose of accessing knowledge*. A second key contribution of the book was the map concept and the principle of mapping. Knowledge accessibility and mapping will now each be explored in further detail.

3.4.1 Knowledge accessibility

Downs and Stea ask ‘how do we get our knowledge?’. They structure an enquiry into the key factors required for developing an ability ‘to know things about the environment’, suggesting that cognitive mapping is a means of storing and processing information – not only the information that specifically relates to the environment, but in general terms. Stephen Kaplan²⁸ provides some possible explanations as to how humans organise and access environmental information.

S Kaplan’s early essay on ‘Cognitive maps in Perception and thought’²⁹ suggests that we have four major types of knowledge and these come into play not only in the real world, but also in our inner space to help us in our handling of incoming [environmental] information, to access the knowledge that is relevant to the situation in hand:

Information Type :

- 1 ‘where one is’: we must be able to identify our current situation –this requires perception of present stimulus array (or cues) but also memory of preceding events;

²⁸ KAPLAN, S. ‘Cognitive Maps in Perception and Thought’ in: DOWNS, Roger, M and STEA, 1973

²⁹ *ibid*

- 2 'what is likely to happen next': the identification of a range of future situations – we make predictions;
- 3 'whether it will be good or bad': the question of goodness or badness of predicted situations – we carry out evaluations;
- 4 'some possible courses of action': we must not become lost in thought.

Around the time of this work when the idea of linking internal visual perception, cognitive mapping and external 'spatial' behaviour was new, it was established that environmental perception is a key process in knowledge generation. Since we are only able to process the information that we actually perceive (using the above four-part model) what we actually perceive in a situation determines what happens next, and what we then do with the information.

Studies in perception highlight that what we perceive is not necessarily what is actually out there, and what is out 'there' is relayed to our brains through what we see. What we see depends on the cues 'available' to us and this is demonstrated by the Brunswick lens model illustrated below in figure 3.4.1.i. The diagram represents the 'person' as a set of boxes that filter or even block incoming 'strands' of information, which in turn shapes the information the person actually receives. It is notable that perception has a role in the design process as an aspect of decision making: this particular diagram illustrates how accuracy of judgement depends on the extent to which the relations on both sides of the lens are the same.

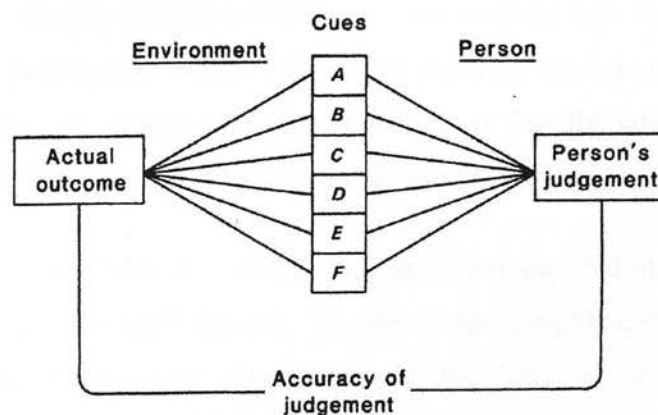


Figure 3.4.1.i – Brunswick's lens model at work in human decision making. (HOGARTH, R, 1987 p 9)

Decision making in the landscape design process is predominantly shaped by incoming visual and spatial 'information'.

Stea and Blaut highlight that *spatial* learning and spatial thinking in environmental design is not identical to *visual* learning and thinking.³⁰ Rather, spatial and visual processes are interlinked, but distinct, aspects of design. The spatial aspect of learning infers the need to be able to organise our information spatially in our heads in order to be able to use it (spatially) in a design project. Whereas the visual aspect of design is explained as follows.

Some notes on visual perception

The optical system provides the interface between brain and environment.³¹ But, what we see is not a direct recording of what is out there, but a mental configuration that we *interpret* as image. It is, according to Barry, the end result of a highly exploratory and complex information-seeking system.

Landscape designers are able to use Lynch's model with ease because it fits with a generic model of the world that all humans use – whether designer or layman - to make sense of, or map, the environment. As already highlighted, the 'cognitive map' is more than an image, it is a process of constructing an image of our environment *spatially*. In the real world we need this information in order to be able to move about, but we also need this in our inner space to enable us to organise and access information – environmental or otherwise.

According to Golledge - a notable writer on cognitive mapping - the point of a cognitive map is 'to represent a great deal of information in a flexible format with an economy of effort'.³² Another key feature Golledge highlights is that the cognitive map is multi-dimensional. This is a significant factor in environmental design.

In real space humans 'translate' 2-dimensional shapes into 3-d objects through having explored them first hand with the eye. We then utilise a highly complex organisation of specialised functions sending messages back and forth as new and everchanging information is received. We actively use the incoming information to construct working images of our environment that tell us vital information such as scale, proportion and distance which we need in order to be able to move around. But, significantly, we also

³⁰ op cit, DOWNS, Roger, M and STEA, 1973

³¹ op cit, BARRY, Anne Marie Seward, 1997

³² GOLLEDGE, R G (ed), *Wayfinding Behaviour*, Johns Hopkins University Press, USA, 1999

need to be moving around in physical space, in order to build up this information in the first instance. The fourth dimension of movement is vital to the process of adding 3-dimensions to what would otherwise be a 2-dimensional image of the world in our mind's eye, because of the way our brains work.

The relevance of the multi-dimensional aspect of cognitive mapping to landscape design is significant. Designers must be able to 'externalise' and communicate their analysis and/or designs on landscapes to others using the same human cognitive processes by which we build up mental images of places ourselves directly, but the designer must do this indirectly, on behalf of the viewer, as it were. Essentially, the designer has to *mimic* or imagine the landscape experience and externalise it, using his/her repertoire of design tools to communicate to others images of place in two, three and maybe four-dimensional formats. Furthermore, he/she must ensure these images communicate basic understanding.

Graphic skills are essential in landscape architecture, not only for the communication of a designer's ideas but for the analytical process itself. Traditionally this begins with sketch-book analysis on site. However, the use of the camera has become more commonplace, largely at the expense of the sketch book. In the educational process, the danger is that this becomes the viewing lens of the landscape, rather than the eye itself. There is a subtle, but significant difference between using the camera as tool for recording what the eye has perceived, and simply using the camera as a tool to record images of the landscape. This small but critical difference in the context of the current discussion, relates to the difference between the landscape *as experienced*, and the landscape *as a scene*.

Barry states we have been misled by the use of analogy between the eye and camera. She terms this the 'fallacy of the photograph'. Quoting from J J Gibson, Barry states that whereas the human eye can perceive the environment by 'sampling' it, the camera cannot. The eye is a complex processing unit to detect change, form and features, and, significantly, it selectively prepares data that the brain must then interpret.

In the context of landscape architecture, the designer must *spatially* interpret such images. Cullen provides a simple analytical technique which can be applied equally as a 'seeing' tool when taking a photograph. and for later interpreting through a pen an ink drawing. For example, **plate 3.4.1** illustrates the use of the technique to draw out the

MESSAGE

People in towns ask 'Where am I, can I join and do I belong???'. For a town to work it must answer these questions by communicating through the silent language of semaphore. Each print draws attention to a word or concept in the language.

• (Lessons from Cullen, Gosling, 1996)

MESSAGE



IMAGE

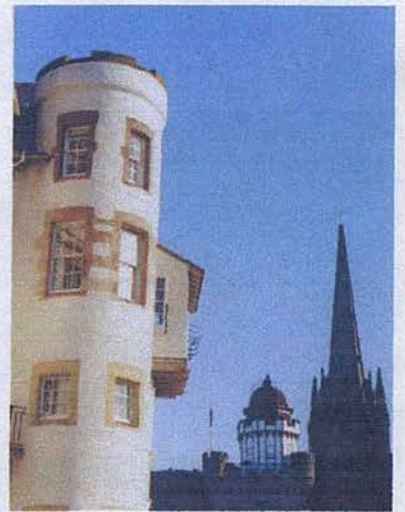
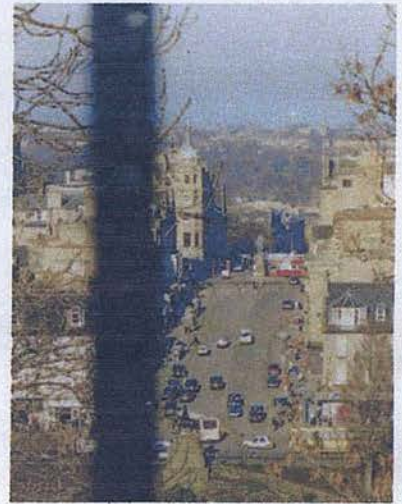


Plate 3.4.1 – Interpreting the ‘silent message’ of the urban landscape. (Researcher’s sketchbook)

‘silent message’ that Cullen states exists in a town’s ‘language of semaphore’.³³ When the technique is applied in this way as an interpretive tool, the process which normally occurs when sketching directly from life, becomes artificially separated: firstly there is the act of taking the photograph and then there is the act of drawing by which process the designer can apply a spatial interpretation of what she saw. This is a deliberate and conscious use of the camera as an analytical tool, and in the context of this thesis, enables the thinking process to be elicited.

The problem with the photo image is that in reality our vision is unframed and therefore unbounded and yet the photograph automatically frames the view.³⁴ In ‘real’ seeing (through the eye) we are able to sense what we are seeing ‘out there’ by being in the environment ourselves: as we move through the environment all of our senses interpret the information. It is this direct engagement that sets up our awareness. Of course the act of taking a photograph necessitates *being in* the landscape in the first instance, and so the usefulness of the camera to the landscape architect is as good as the designer’s ability to ‘see’. The problem is, how do we know whether or not we are good at ‘seeing’?

The fact that we have survived as a species tells us that the mechanism of perception, and our perceptual mapping process must be working.³⁵ But even though our image of the world is shared by others with the same cultural background, our own individual image maps are uniquely shaped by personal experience and biological ‘tuning’. We tend to overestimate certain aspects of perception and diminish others, such as height and width, or notice only the things that ‘afford’ us with what we need according our motivations and purposes at a given time and place. Figure 3.4.1.ii provides a simple example of how selective our perception of the

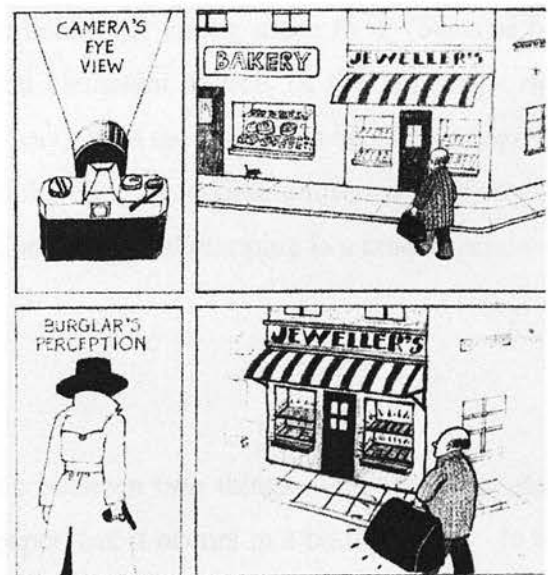


Figure 3.4.1.ii – Environmental affordance: selective perception. (HOOPER, Professor Kristina, 1976, p 21)

³³ GOSLING, David, *Gordon Cullen: Visions of Urban Design*, Academy Editions, 1996

³⁴ op cit, BARRY, Anne Marie Seward, 1997

³⁵ ibid

environment can be in relation to the concept of affordance.

Affordance

The limiting effect of environmental affordance on design is that designers are predisposed to seeing the world according to their own schemata, not others. The example in figure 3.4.1.ii above highlights how easily visual information can be eliminated or enhanced depending on our environmental bias. Professor Hooper³⁶ states that we *can* change the way we see things, but only when we accept that what we think we see is merely our perception of the world: it is then that we can constructively move beyond this point.

Environmental bias in visual perception is interlinked with concepts of the Gestalt, which in turn programmes us towards visual efficiency. Visual efficiency is similar, but not identical to, the concept of selective observation as shown in the burglar's perception above. Visual efficiency is our brain's way of coping with the vast array of visual information it has to process. It is the Gestalt related principle known as 'perceptual associationistic logic' which causes our brains to link up lines placed close together or similar colours and shapes to form complete units that are segregated from an apparently receding background.³⁷ Apparently, neurologically speaking, all images are by nature gestalts, made up of fragments of visual experiences that our brains link together. This thesis suggests that the problem is, if we are unable to perceive a link between spatial attributes of place and the behaviour taking place in it, (because our minds are trained to link the structural and elemental aspects of the landscape in a 'spatial' rather than a 'spatial-behavioural' way), then the process is highly predisposed to excluding, or at least receding into the background, behavioural information from the designer's perceived image of the world. The concept of mapping is a crucial aspect of visual processing system.

3.4.2 The principle of mapping

Mapping technically means the relationship between two things. This does not only occur in the 2-dimensions of mapping on paper, but it occurs in a bodily sense. In his

³⁶ HOOPER, Professor Kristina, *Imaging and Visual Thinking*, The Open University Press, 1976

³⁷ op cit, BARRY, Anne Marie Seward, 1997

seminal work 'The design of everyday things'³⁸ Norman describes the relationships we make between physical 'objects' and the consequences of us carrying out a particular task in relation to that object which he terms 'natural mapping'. For example, we make a natural mapping between the steering wheel of a car, and its turning left or right, and the turning of the car itself. This type of mapping is easily learned and remembered since the wheel and anti-clockwise direction are 'natural' choices: they are visible, closely related to the desired outcome and provide immediate feedback (the wheel turns the car). Natural mappings follow principles of form and function and this is effectively 'legibility of use' which Carr et al described as the ability of a place to communicate its meaning and purpose to the user.³⁹

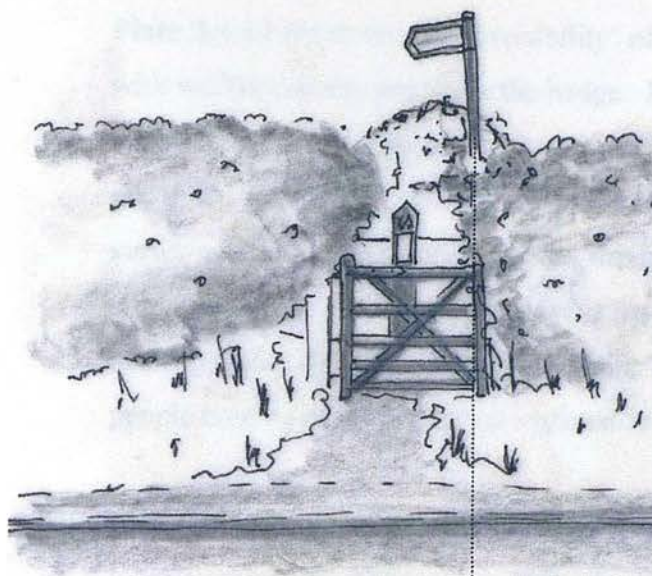
The principle of natural mapping occurs in conjunction with the concept of feedback. The principle of feedback is the sending back of information about what action has actually been done and what result accomplished, for example the driving wheel turns the car. The designer must be able to conceptualise user/product 'feedback' whilst in the process of designing, but this is problematic. To introduce the feedback/natural mapping concept into the design process entails the projection of oneself into the design, as a 'normal' everyday user. To explore how this can be achieved in the landscape design process, **plate 3.4.2.i** illustrates some simple analysis of the 'legibility of use' of an entrance to a newly planted local amenity woodland site near London.

The illustrated site analysis was conducted in the context of a larger wayfinding study⁴⁰. It is notable that the recreation manager of this site was keen to attract as many local users as possible but the site was not intended for large visitor catchment and, with the exception of one entrance which had entrance signs, road signs were not used to draw visitors into this site. This provided an opportunity to study the role of the spatial setting itself in wayfinding – whether intrinsic or designed site factors – in the absence of signs. In assessing the 'legibility of use' of entrances to the site, a number of perceptual issues raised so far in this chapter, and the key role of certain principles for design, notably 'natural mapping', can be elicited.

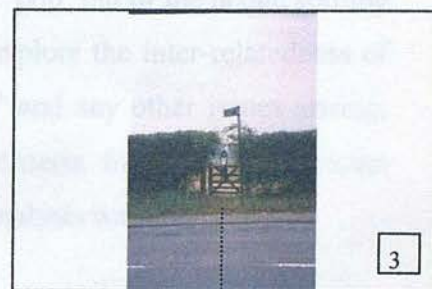
³⁸ NORMAN, D, *The Design of Everyday Things*, MIT Press, USA 1998 (the original book was titled NORMAN, D, *The Psychology of Everyday Things*, Basic Books, New York, 1988)

³⁹ op cit, CARR, S, et al 1992, p 188

⁴⁰ The British Forestry Commission appointed the 'OPENspace – The Research Centre for Inclusive Access to Outdoor Environments', Edinburgh College of Art/Heriot-Watt University, to conduct a report on the effectiveness of wayfinding systems with forest users. This report followed an initial phase one scoping study which was instigated after an annual UK wide Forestry Commission visitor survey revealed a low satisfaction rating with road signs. This researcher played an active role in both phases of the research, through to the final draft report stage, over the period 2000-2003, introducing the use of integrated spatial-behaviour analysis as a site survey tool for contextualising interviews conducted at a variety of sites around England, Wales and Scotland.



The footpath gate access, the footpath sign and the welcome sign, are all completely invisible at driving speed along the road: at walking speed this is a very welcoming gate to pedestrians, but a lost opportunity for 'self publicity' to local people driving past.



(a convenient place to park directly opposite the gate)

Plate no 3.4.2.i– Assessing an entrance for 'legibility of use'.

Plate 3.4.2.i illustrates the ‘invisibility’ of an entrance gate at driving speed compared with walking speed, hidden in the hedge. Initially, this would seem to be an irrelevance because the gate is designed as a pedestrian access point. However, the researcher had generated a design hypothesis based on analysis conducted at other sites, that to open up views of the entrance areas in the driver’s view, could gain the site greater ‘self-publicity’ by encouraging a future visit from local people passing by to/from local areas of settlement. In this instance, the site is located on a busy local connecting route for people coming off/on the larger regional routes into/out of London.

The illustrated gate not only appeared to present a lost opportunity for ‘self-publicity’, but also raised a safety issue. Here, the gate is very close to the edge of the road and because it disappears into the hedge, people were seen to ‘pop’ out of the hedge spilling into the road with bikes and baby buggies. To further explore the inter-relatedness of ‘visual accessibility’, ‘self-publicity’, ‘usability’, ‘safety’ and any other issues arising, the role of *entrance visibility* and its validity as a criteria for evaluating design performance overall in terms of ‘finding’, the following analysis was conducted.

Evaluating entrance for visibility



Figure 3.4.1.iii – a bridge entry point to a new planted amenity woodland site: view from neighbouring municipal park.

The most often used entrances in the same ‘wayfinding system’, (that is, different entrances to the same site), as became highlighted in an interview survey, gave the potential visitor good

views of the entrance point and into the site itself, appearing to enable the user to make a visual link, (that is a make a ‘natural mapping’), between ‘entrance’, how to get to it, where the entrance led to and ‘something going on inside’.

The importance of entrance visibility in the particular example given was verified through interview analysis. Some of the overriding

reasons why people *decided* to come into the site was because of something they ‘saw’ – whether other people going in and out, the bridge being built, or they had driven or walked past and ‘seen it’ before. The interview data for this can be viewed in Appendix A.1 and A.2.

Towards the entry point shown above in figure 3.4.1.iii above, although visitors were unsure about a number of things, for example whether dogs were allowed and where the paths led to, this entrance had no trouble attracting people to at least come and take a look. This entry point is in fact a bridge not a gate, but it nonetheless serves the purpose of ‘entrance’, not least for providing users with the time and space for making the decision to enter. For example, people were observed spending time hovering around the bridge and sometimes just walking back and forth again to take a look, as if the ‘easy in/easy out’ factor was important, or to take a quick look now to come back later, although this may have been that they went to have a look and did not understand what to do, and so came back again.

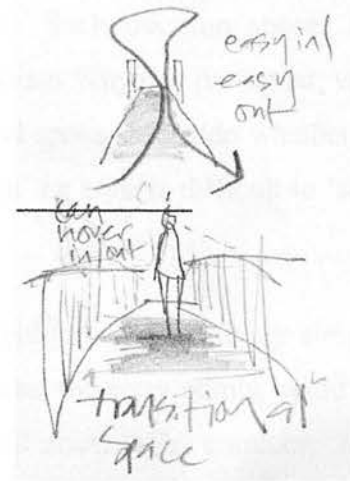


Figure 3.4.1.iv – analysing a bridge entry point for usability.

However, this highly visible entrance, provided good ‘self-publicity’, it was easy to ‘find’, and with traffic safety not an arising issue, this entrance was easy to ‘use’.

In consideration of the footbridge example above, it may be said that good visibility is a contributory factor to ‘legibility of use’ because it facilitates the ‘natural mapping’ process. As suggested earlier, natural mapping and feedback work together in user-centred design. This relationship will now be given further consideration.

Natural mapping and feedback

The gate analysis given above and shown in **plate 3.4.2.i** (page 106) highlights the potential utility of ‘feedback’ in wayfinding design. The example illustrated a way of designing for users’ wayfinding needs by projecting oneself into the design as user – in this instance by role-playing the driving route along the road when passing the gate. In this example, on the opposite side of the road to the gate hidden in the hedge, there was an area which could be used for parking in order to gain access to the site at this point. In fact, the occasional user was observed using the parking space to leave their car and then enter the site on foot using the illustrated gate. This indicates a potential increase in use of the site, were the hedges cut back to improve visibility of the gate in the car driver’s view from the road, when approaching in the direction illustrated, in order to inform the driver of the possibility of a future visit by foot, *or* by car. Also, the opening up of views would enable the user to make a ‘natural mapping’ between entrance and

the opportunity to park and therefore an opportunity to stop and take a look *there and then*. Such opportunities were seen to be useful to users at other sites as an integral aspect of wayfinding, where visitors would often call in ‘on spec’ to see what a site had to offer in order to plan a return visit in the future. Such decision spaces are ‘transitional spaces’ as highlighted by Alexander, and William Whyte in particular, who emphasised the role of zones which give people time and space to decide whether to enter a place or not. The difference in this instance is that the zone is difficult to ‘see’ and therefore difficult to define spatially.

The example of the hidden gate and the footbridge highlight that relatively simple design changes, notably, opening up views into a site around the entry points, could be made to enhance the visibility, and thereby the usability and safety, of an entrance. The fact that such simple factors were not incorporated into the design of many of the sites visited during the forest wayfinding study as a whole, (10 formal site visits in all), could be seen to indicate the utility of such analysis, but on the other hand it highlights the potential difficulty in planning for good design performance *pre-build*, given that each entrance and site situation presents a unique set of conditions for consideration. The gate analysis above suggests the use of role-play for acting out scenarios of use such as ‘finding entrance’ is useful for *post-occupancy* evaluation, but this could potentially also be used to test out un-built designs *during* the design process. In this instance the designer would have to identify a similar situation for a kind of ‘prototype’ testing. Since the application of the principles of ‘feedback’ and ‘natural mapping’ in visual-spatial analysis help the designer to ‘see’ the two-way relationship between environment and behavioural effect in existing space, *in theory*, the process should help the designer envisage the effects of an unbuilt design. Thus, in developing the skills for making accurate representation of an *existing* landscape experience, the designer is also developing the skills needed to build user needs assessment into the design process in the *imagined* situation. The principle of feedback is key to the process.

The relevance of ‘feedback’ as a principle for design

Historically, ‘feedback’ has been important in making visual representations of the world in everyday public use, most notably in the sphere of cartography. This is now at a stage where it is believed representations of the real world are accurate and it is only through feedback from human use of the maps that inaccuracies come to light:

"It is significant that the error here is the failure of correspondence between an external map and an internal map, in which it is the failure of the external map which produces correction as a function of the social system."⁴¹

A landscape architect's use of mapping to gain impressions helps to 'see' patterns in the landscape. Although these impressions do build in 'facts' such as contours, areas of settlement, river corridors, underlying geology and so on, visual analysis alone is not enough to build in user perception and 'usability' of the landscape, as evidenced by the existence of the applicability gap problem: for building user needs and human behavioural considerations into the landscape design process, our design tools appear to be inadequate.

It is important to distinguish between the different applications of mapping. In one sense mapping may be considered simply a process of representing reality – both internally in the mind, and externally – on paper, for example. But in another, sense, as described by 'natural mapping', the process is a means of identifying possible relationships between objects. Thus, when we talk of mapping in a physical, or graphic sense 'on paper' as it were, what we are mapping as landscape architects is not necessarily 'factual' – they may simply be impressions.

Designers work simultaneously in two and three dimensions – using 'maps', diagrams, sketches and photos, and so on. In addition, landscape designers need to problem solve in the fourth dimension where change over time and movement are considered. As highlighted by scientists in perceptual psychology, movement is essential to the constructing of mental images of place in 3-dimensions because of the way the human eye works in conjunction with the brain when processing incoming information. The way they work together enables humans to i) discern form, and ii) recognise patterns⁴²:

i) discerning form

Humans can add 3-dimensional form to object/s in view either by physically moving about in space and/or by the way our eye 'roves' around objects in space.

ii) recognising patterns

Humans are able to recognise patterns and sift out 'relevant' information from all that is not relevant to the situation in hand.

⁴¹ BOULDING, in DOWNS, Roger, M and STEA, 1973, p ix (foreword)

⁴² op cit, BARRY, Anne Marie Seward, 1997

The way humans (designers in this instance) are able to discern form, and recognise patterns requires a basic understanding that the two process are related. Mapping landscape 'form' is crucial to its conceptualisation in the first instance, and the problem is that, if its form is considered in spatial, rather than spatial-behavioural, terms then it is difficult for the designer to then relate behavioural patterns to spatial form. The way in which the designer 'sees' the landscape is critical to the design response, and towards addressing the gap problem:

“...how one “images” the world literally conditions how reality is both conceptualised and shaped...”⁴³

It is a feature of design in general that we do not necessarily know what we have seen until we have drawn it. There is an inextricable link between drawing or mapping on paper as it were, and 'natural mapping' in landscape perception. The more we draw, the more we see: in this way 'doing' becomes inseparable from 'seeing', the one enabling the other. The use of drawing, 'paper' mapping and any other method for visual analysis is the key to enabling new ways of seeing in design, but it is their mode of application that is crucial towards shifting thinking towards designing *with the user in mind*.

Perception and visual analysis

The potential for the use of 'paper' mapping to present information in totally new ways owes much to the work of Patrick Geddes who is considered a pioneer geographer in Britain. Geddes' passion for geography, emerged *from* an interest in cartography rather than the other way around.⁴⁴ This enabled a different kind of study to be undertaken. To Geddes, putting 'facts' before theory was essential and cartography provided the best method of displaying a wide range of information, in a visual way. The use of mapping was integral to his 'region' concept and the development of his theory of 'Eutopia': “it makes sense to design with the forms and cultural and ecological processes already present in a location rather than to force an idealized, preconceived plan upon a site. *Eutopia* is ensured when culture and ecology become part of design thinking”.⁴⁵

Geddes' aim was to explore the interaction of geographical and social factors and how they produced evolutionary trends. It was from this exploration that Geddes came to

⁴³ op cit, CORNER, James, (Ed), 1999, p 153

⁴⁴ SUTCLIFFE, Anthony (Ed), *The Rise of Modern Planning 1800-1914*. Mansell Publishing, London, 1980

⁴⁵ HOUGH, M, *Out of Place*. Yale University Press, New Haven and London, 1990, p 64

conceptualise the place/work/folk paradigm⁴⁶, which was described earlier as his 'thinking machine'. Geddes' theories thus emerged from the *relationships* between factors that he was able to establish through his use of mapping as a visual analytical tool.

The significant role that visual analysis plays in design and human cognition in general, is related to the fact that we are creatures that have evolved to be highly dependent on the power of sight for our survival. In J J Gibson's view of perception, which has its roots in Gestalt theory, he states that humans have a natural mechanism for detecting 'ecologically significant information'⁴⁷. Human evolution has been geared towards perceiving 'useful possibilities for action'⁴⁸, examples of which include surfaces for walking, handles for pulling, landmarks for orientation, and so on, and is a concept termed 'environmental affordance'. Put more simply, affordance is about identifying 'what's in it for me?'⁴⁹

Through the study of human interaction with the physical environment and objects in it, Norman⁵⁰ developed a conceptual model which became applied to many areas of user-centred design such as product design. In particular, the design of systems in digital space have advanced theory on human 'usability' of products and systems, notably in the sphere of human computer interaction studies. In this field Norman is attributed as a key developer in user-centered design, for his contribution of the 'interface' concept.

In Norman's work, which is grounded in cognitive psychology, he discusses the design of physical objects in terms of 'interfaces', such as door handles, which is best explained by the following quote:

"You are approaching a door through which you eventually want to pass. The door, and the manner in which it is secured to the wall, permits opening by pushing it from its 'closed' position. We say that the door affords (or allows, or is for) opening by pushing. On approaching that door you observe a flat plate fixed to it at waist height on the 'non-hinge' side, and possibly some sticky finger marks on its otherwise polished surface. You deduce that the door is meant to be pushed open: you therefore push on the plate, whereupon the door opens and you pass through. Here, there is a perceived affordance, triggered by the sight of the plate and the finger marks, that is identical with the actual affordance. Note that the affordance

⁴⁶ (The 'Place, Work, Folk' formula was originally conceptualised by Le Play in France.)

⁴⁷ op cit, BARRY, Anne Marie Seward, 1997

⁴⁸ GIBSON, J, The Ecological Approach to Visual Perception, Lawrence Erlbaum Associates, Hillsdale, NJ, 1986

⁴⁹ op cit, APPLETON, Jay, 1996

⁵⁰ op cit, NORMAN, D, 1998

we discuss is neither the door nor the plate: it is a property of the door (the door affords opening by pushing)."⁵¹

The interface concept provides a means of introducing user needs assessment into the design process. According to the theory, the interface concept may occur at any scale and in any setting. Thus, in Edinburgh Old Town for example, the streets and urban spaces – the paving materials, the building frontages, the doorways and entrances to buildings and smaller streets, the glimpses out across the town, and the signage, all provide certain cues which afford the navigating tourist (for example) who is ‘using’ the town as a place to explore, a set of environmental information (see **plate 3.4.2.ii**).

When applying the interface concept, some aspects of the environment ‘help’ the activity, others ‘hinder’. They can be identified through ‘simulating’ the experience using the spatial sequence technique *if* the designer can ‘see’ the environment from the user’s perspective. Similarly, when analysing an entrance for what it affords the person finding their way towards a forest site by car, for example, the road space itself, the factors that ‘enclose’ the drivers view, the signs, the views from the road, and so on, provide the interface - but only those that arise in the view from the road when role-playing the user’s experience of approaching the site from the car driver’s view, at driving speed.

The ergonomics principles which are built into the product design approach – namely ‘feedback’ and the interface concept - help link the knowledge base of psychology and behavioural science into design. In landscape architecture the approach provides a means of introducing evaluation into the design process. The applicability of the approach will now be further explored.

3.5 APPLICABILITY OF THE PRODUCT DESIGN APPROACH TO LANDSCAPE DESIGN

Human computer interaction (HCI) has many parallels with human/environment interaction in real space. They both utilise the same cognitive processes since primarily people are navigating their way through space and interacting with ‘information’ as they move through it.⁵² In fact a fundamental shift in thinking in HCI occurred when theorists began to view the mind in terms of information processing.

⁵¹ *ibid*, NORMAN, D, 1998, p 3

⁵² PREECE, Jenny, *A Guide to Usability – Human Factors in Computing*. Addison Wesley, UK, 1993

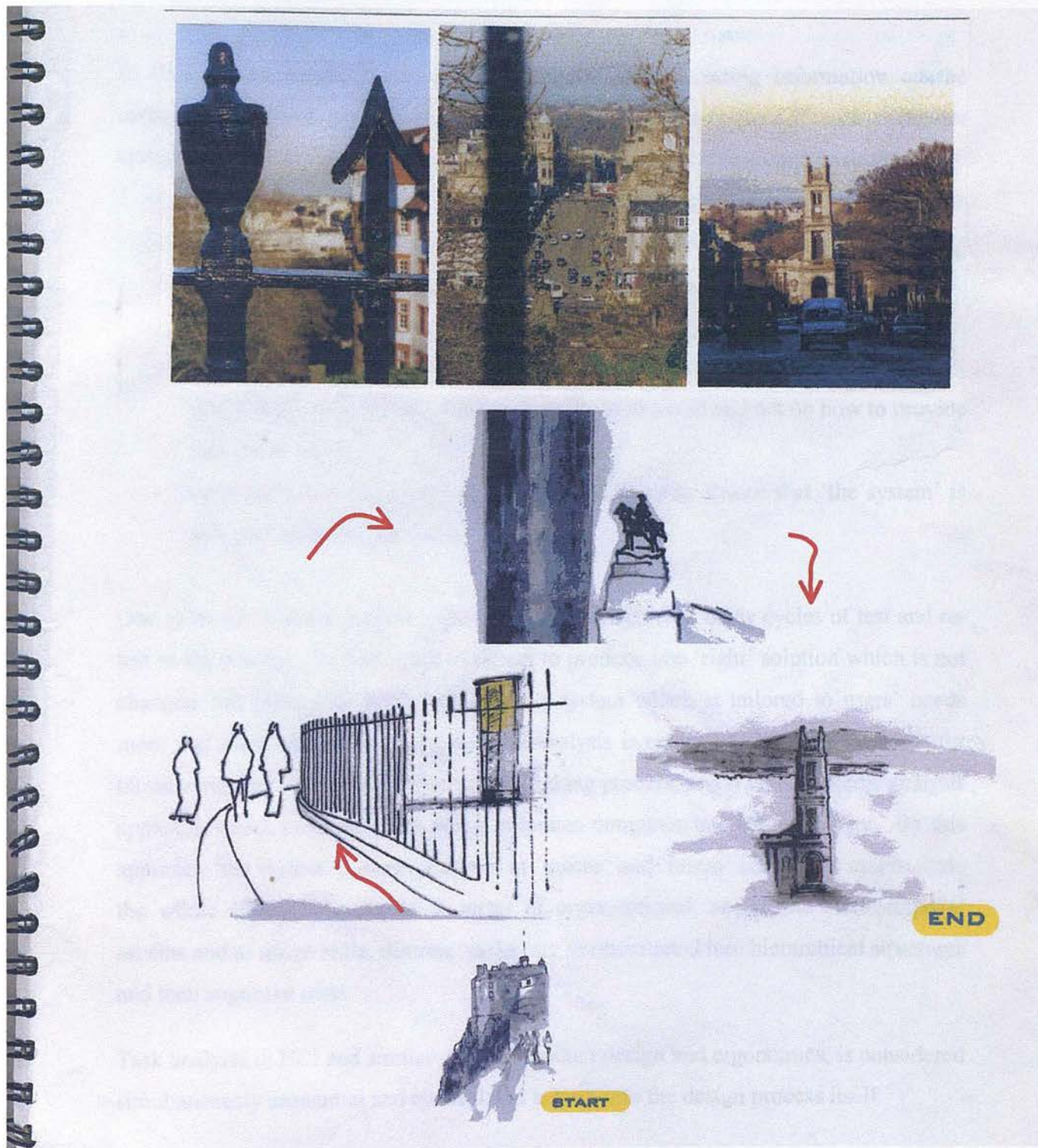


Plate 3.4.2.ii – Using the interface concept to conduct a visual-spatial analysis of the urban experience in terms of what it affords the navigating tourist, from a given viewpoint.

A main implication for HCI is that the concept of information processing has provided the theoretical basis from which various design and evaluation methods have been developed.

In HCI, where people are accessing, manipulating or creating information on the computer, cognitive psychology can help to improve the design of such computer systems. There are certain principles set out in HCI for involving users in designs:

- focus on the users and the users' needs and in doing so make user issues rather than technical considerations central in the design process;
- carry out a task analysis in which details of the users' tasks and information about the task environment are collected so that users needs are well understood. Task analysis needs to be done in addition to a general requirements analysis, which tends to focus on what functionality is required and not on how to provide that functionality;
- carry out early testing and evaluation with users to ensure that 'the system' is designed to meet their needs.⁵³

One of its key features is the notion of *iterative* design with many cycles of test and re-test in the process. Its aim is not to expect to produce one 'right' solution which is not changed, but instead to design an evolving system which is tailored to users' needs more and more, with each iteration. Task analysis is central to the design process for introducing user needs assessment to the thinking process, and it is the systems analysis approach which enables this to occur in human computer interaction studies. By this approach 'the system' is conceptualised at 'macro' and 'micro' scales. At macro scale the whole system is analysed in terms of organisational, social and environmental aspects and at micro scale, discrete 'tasks' are deconstructed into hierarchical structures and then cognitive units.

Task analysis in HCI and similar areas of product design and ergonomics, is considered simultaneously sequential and cyclical and is built into the design process itself:

a) The Sequential approach to user centred design:

Task analysis requires an understanding of the sequence of actions required by a user to collectively carry out one activity. In the area of environmental design, this type of

⁵³ op cit, J, PREECE, 1993

approach was originally conceptualised some thirty years ago by Perin who described the concept in terms of ‘behaviour circuitory’. In recognition of the need for a whole new system of conceptualising, Perin realised the need for a technique for describing an entire activity sequence. Figure 3.5.i illustrates the many smaller actions that Perin identified within the simple act of ‘going shopping’ and figure 3.5.ii (a) and (b) illustrates a type of notation she suggested for visualising such sequences. The red hatched box in figure 3.5.i approximately represents the range of tasks that are relevant to the landscape architect - in particular the walking/crossing the street task is highlighted.

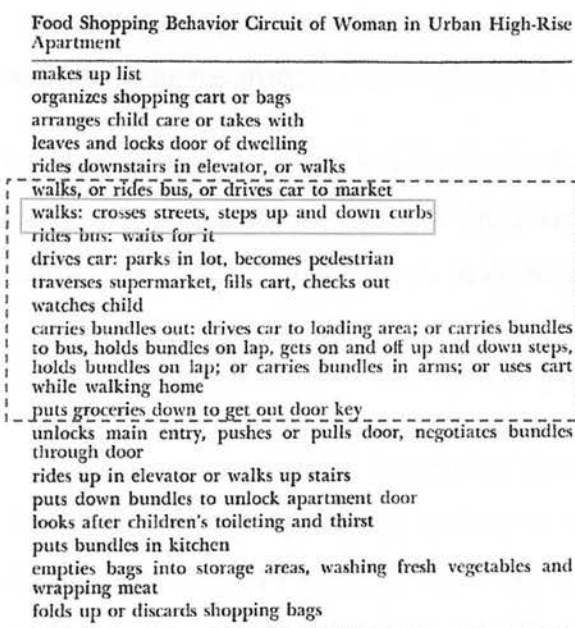


Figure 3.5.i - Food Shopping Behaviour Circuit (PERIN, C, 1970, p84)

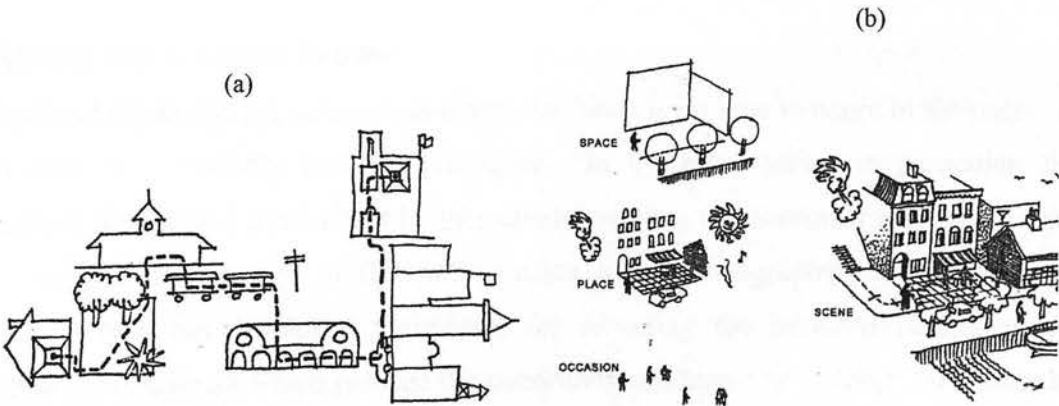


Figure 3.5.ii - Thiel's interpretation of the behaviour circuit theory and his envirotecture concept (JARVIS, 2002^a, p 25): (a) Analysing a commuter route; and (b) Thiel's envirotectural theatre concept: the interaction of people and space to create environmental scenes.

Lynch/Appleyard had drawn on the work of Philip Thiel in the development of their work. Thiel had previously suggested the use of 'sequence space notation' after being inspired by Perin's Behaviour Circuit concept. Thiel contributed to theoretical development towards integrated spatial/behavioural thinking, introducing new words which attempted to integrate behavioural concepts with the architectural approach. He is best known – at least to those who take an interest - for his idea of 'envirotecture' which combines considerations of space and time, people and purpose. He explored environmental behaviour in theatrical terms, as if 'place' is a stage set and users are players acting out scenes. Thus, Thiel looked to the performance based arts for models and approaches to design by which "experience is the overall comprehensive goal"⁵⁴. He also explored ways of introducing behaviour circuitory (figure 3.5.ii (a)) and ways of conceptualising the spaces as 'environmental scenes' (figure 3.5.ii (b)).

For landscape design purposes, to incorporate the behaviour circuit/task based analysis in spatial sequence analysis, the individual tasks which involve spatial/behavioural interaction with place, such as the task in Perin's shopping sequence highlighted by the green outlined text in figure 3.5.i as 'walks: crosses streets, steps up and down curbs', could be conceptualised as individual discrete spatial/behavioural 'units' of study.

b) The Cyclical approach to user centred design:

The whole process of designing 'the system' in the product design approach is cyclical in the sense that it must be constantly refined and retested as its individual parts are developed and user needs are incorporated and design ideas tested using the 'feedback' principle. The general principle is to design 'the machine' to adapt to the user, and not the other way around.

Adapting the 'machine' to user

Retail and marketing are other areas where the focus is on how to adapt to the user – in this case the constantly changing customer. In the retail sector in particular, the expertise for this has come about by intensively studying the consumer interacting with the physical environment of the selling place using ethnographic style techniques. Such research has developed techniques for revealing the minutest details of the physical environment which provide the conditions conducive to 'selling'. A quote by Underhill sums up the philosophy: "the obvious isn't always apparent"⁵⁵.

⁵⁴ JARVIS, Bob^a, "People, Paths and Purposes", Urban Design Quarterly, Issue 82, Spring 2002, p 25

⁵⁵ UNDERHILL, Paco, Why we buy. The science of shopping. Touchstone, New York, 1999, p 19

In retail it is recognised that around 70% of all purchases made are unplanned:

"If we went into stores only when we needed to buy something, and if once there we bought only what we needed, the economy would collapse..."⁵⁶

This sector recognises that the length a shopper spends time – and therefore money – depends on how enjoyable the experience and how comfortable. Thus 'usability' is 'profitability'. In the outdoor setting, if we only went outside when absolutely necessary the economy might not collapse, but there would be (and has been in some places) serious social and psychological breakdown. This is the underpinning of environment-behaviour research in environmental design, as begun some thirty years ago.

Norman's original interface concept was greatly influenced by Gibson's theory of affordance. In turn, Gibson's original concept was informed by the Gestalt which resided in the 'holistic' view of perception⁵⁷. This view asserts that the whole is the sum of its parts, and that there is a *relationship* between all the parts, with reference to the door opening example these are the handle, the fingerprints on the finger plate and so on. Thus, the Gestalt affects our visual thinking *experientially* as a relational tool – that is, our ability to make associations between 'things' visible that enable us to use a door or a street or an entire city, according to our particular intent, or purpose, for using the environment.

As described earlier, 'good' visual form, according to Gestalt theory, relates to 'proximity, similarity, closed forms (closure) and good contour (common density), common movement and experience'⁵⁸. The latter two aspects of the theory are far less easy to describe, explain and visualise tending to be side-stepped in the literature in favour of these aspects that are more easily illustrated, such as the hour glass figure. In the context of environment-behaviour research, the same problem is highlighted by Teklenburg and Heitor.⁵⁹ These authors identify a distinction between 'static' and 'dynamic' behaviour, noting that behaviour at 'geographic' scale is static when

⁵⁶ *ibid*, UNDERHILL, Paco, 1999, p 31

⁵⁷ *op cit*, BARRY, Anne Marie Seward, 1997

⁵⁸ *op cit*, GOSLING, David, 1996

⁵⁹ TEKLENBURG, Jan A F, HEITOR, Teresa V, "Spatial analysis in environment-behaviour studies: Topics and trends", presented at the meeting of the Spatial Analysis Network at the IAPS 14 conference 'Evolving Environmental Ideals, Changing Ways of Life, Values and Design Practices, Stockholm, 30 Jul-3 August, 1996 <http://www.bwk.tue.nl/urb/p/Jan/Spatial.htm>

observed from the frame of reference of environment-behaviour research at the scale of urban districts, plazas and streets and so on, and is 'dynamic' at the smaller scale. Because of this, it is suggested that 'static' behaviour is easier to describe in an objective way than 'dynamic' behaviour, and thus the latter is more difficult to conceptualise.

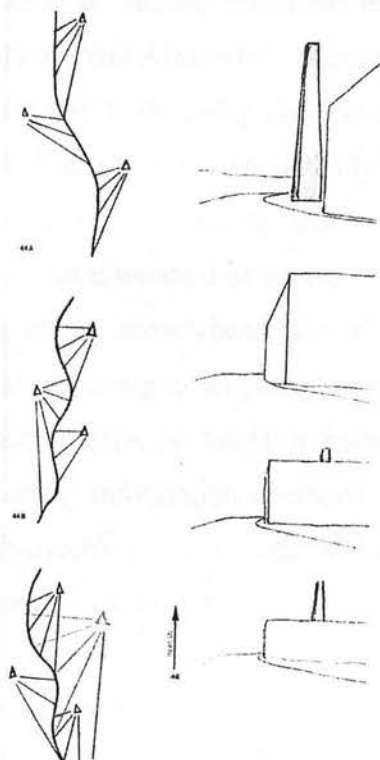


Figure 3.5.iii - 'Sequential form': a suggested useful tool for analysing 'dynamic' aspects of the landscape experience. (APPLEYARD, D, LYNCH, K, MYER, J R, MIT Press, USA 1964 USA 1964, p 47)

The sequential approach originally developed by Appleyard/Lynch/Myer in the 'View from the Road' study,⁶⁰ might be considered a groundwork in how to illustrate dynamic behaviour in relation to the dynamic aspects of Gestalt theory – namely, 'common movement' and 'experience' - which affect our visual thinking *experientially*, whilst in *motion*.

Common movement and experience

Although the 'View from the Road' was not a study of the Gestalt as such - rather it was an exploration of the 'art' of road design from the perspective of the driver's experience - it demonstrates some aspects of the Gestalt at work. In particular it highlights

how humans make associations between 'things' visible on the move for navigation purposes.

The 'View from the Road' study suggested 'sequential form' was a useful model for highway design (figure 3.5.iii). Using this model, all the visible elements that appear whilst moving through the landscape in the view framed by the car window, from the driving position (effectively the 'interface') were recorded, analysed and 'reconstructed' using image sequences that matched what people actually perceived when driving along. What these researchers found was that the driver is engaged in building up a locational image of his environment and in orienting himself within this image. To achieve this the study found that humans select from the landscape a succession of

⁶⁰ APPLEYARD, D, LYNCH, K, MYER, J R, The View from the Road, MIT Press, USA 1964

approaches to goals: these are prominent landmarks or focal points which the observer moves towards, attains, passes by and moves on to the next one. The same principle applies at walking speed.

The spatial strategy for moving through the landscape at walking speed has been identified by Christopher Alexander. Alexander identifies a pattern of 'paths and goals' (pattern no. 120)⁶¹

where humans act 'like pinballs' (see figures 3.5.iv and v) bouncing from goal to goal

towards an ultimate destination. Alexander suggests that selecting a series of temporary goals in the view ahead makes our environmental experience more simplified and avoids us having to set goals every minute. Thus, our eye moves from object to object, generating gaps, or 'voids' in between, leaving our brain time to relax in between, thus preventing information overload. Also, subconsciously our brains link together the landmarks (or goals) in order to locate us in space. This is the Gestalt concept at work in 'common movement' and 'experience' but at different scales.



Figure 3.5.iv – Pattern no 120: People 'like pinballs': *a series of goals* (ALEXANDER, Christopher, 1977, p587)

Shifting goals

Unlike driving, when walking we have more choice of route, albeit that our choices are often limited by the path layout. Alexander states that paths should be considered in relation to three complementary processes. Firstly he suggests that humans naturally cut corners and take 'diagonal' paths in a 'Path to a goal' approach; secondly, Alexander suggests that because intermediate destinations keep changing, we move like a missile tracking a moving target; and thirdly, since we do not want to keep recalculating changes of direction while walking we pick temporary goals, such as a visible landmark which is more or less in the direction we want to take for a short distance (Alexander suggests 100 yards), and as we near it we pick a new one: "You do this so that in between, you can talk, think, daydream, smell the spring, without having to think about your walking direction every minute"⁶².

⁶¹ ALEXANDER, Christopher, *A Pattern Language: towns, buildings, construction*, Oxford University, 1977

⁶² *ibid*, p 587

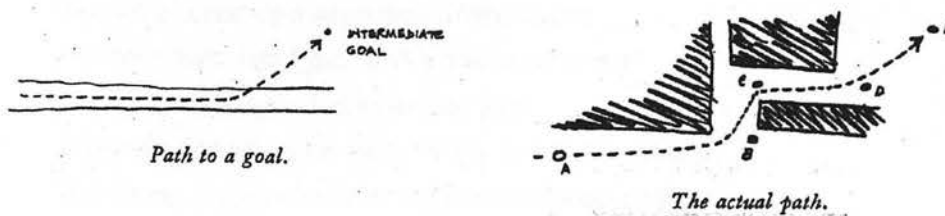


Figure 3.5.v – Pattern no 120: People ‘like pinballs’: *path to a goal* and *the actual path*. (ALEXANDER, Christopher, 1977, pp 586-587)

The idea of there being some kind of intent, or purpose on the user’s part is built into the design process in product design and human computer interaction and the testing of the product is task driven. In the area of HCI, studies of the user-led task relates to some form of exploratory activity.

In HCI studies, paths are used as an evaluative tool in the form of ‘trails’. By mapping peoples’ paths electronically it is possible to discover more about users’ browsing strategies, as illustrated in figure 3.5.vi below. In hypertext design - the computer interface systems created for human usability - users of such systems are seen to browse, scan or search and are perceived as having certain expectations about gaining access to information. The predominant expectation is of instantaneous and immediate information retrieval.⁶³ In order to assess the ‘usability’ of such systems, and to assess their design quality, entails an analysis of how well chunks of information are linked together.

Figure 3.5.vi illustrates the different ways users link together information in digital space according to their purpose. The table shows the outcome of a study conducted by Canter et al⁶⁴ of the way users navigate their way around a database. In the study of people displayed different browsing strategies and after the paths chosen by users were measured using a set of indices (pathiness, ringiness, loopiness, spikiness, and number of nodes traversed and the ratio of the number of different nodes visited to the number of visits to nodes) they concluded that there are five discernible search strategies as follows:⁶⁵

⁶³ McALEESE, Ray (Ed), *Hypertext. Theory into Practice.*, Intellect Ltd, UK, 1999

⁶⁴ CANTER ET AL (1985) in: McALEESE, Ray (Ed), 1999

⁶⁵ derived from PASK AND SCOTT, 1972 in: McALEESE, Ray (Ed), 1999 pp 9-10

'Scanning: covering a large area without depth.

Browsing: following a path until a goal is achieved.

Searching: striving to find an explicit goal.

Exploring: finding out the extent of the information given.

Wandering: purposeless and unstructured globe-trotting.'

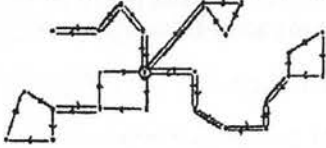
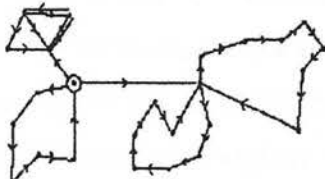
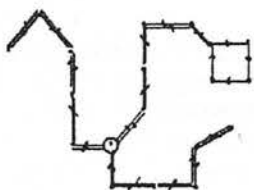
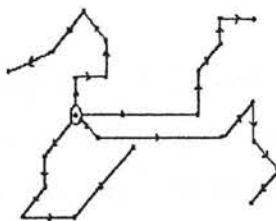
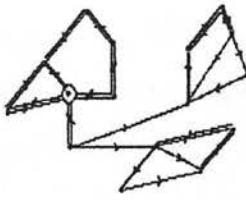
Strategy	Description	Representation
Scanning	A mixture of deep spikes and short loops as users seek to cover a large area but without great depth. High NV/NT. High SQ. Medium LQ.	
Browsing	Many long loops and a few large rings, where users are happy to go wherever the data takes them until their interest is caught. Medium LQ. Medium RQ. Medium NV/NS.	
Searching	Ever-increasing spikes with a few loops for users motivated to find a particular target. High SQ. Medium LQ. Low NV/NS.	
Exploring	Many different paths, suggesting users who are seeking the extent and nature of the field. High PQ. High NV/NT.	
Wandering	Many medium-sized rings as the user ambles along and inevitably revisits nodes in an unstructured journey. High RQ. Low NV/NS. Medium NV/NT.	

Figure 3.5.vi - Browsing strategies in digital space. (CANTER et al, 1985, in McALEESE, R, (ed), 1999, p 11)

In the table shown above, the difference between browsing and searching is most pronounced - the former being characterised by loopiness and the latter by spikiness. In this way, the path shapes with distinctive attributes were used in the above study as 'indicators' of people's use of a system.

In the physical world, wayfinding is distinguishable from exploring because there is a need to be at a particular destination within a particular time scale.⁶⁶ What links the two is the notion of finding. Wayfinding difficulties are not attributable to scale, albeit that scale exacerbates the problem; rather, the fundamental cause is recognised as a basic planning neglect.⁶⁷ Getting it right in design is difficult since it involves a comprehensive understanding of an environmental experience in a place that might not yet exist. Thus, it involves an ability to imagine the whole experience. As an activity, wayfinding is one like few others that demands a complete involvement with the environment.⁶⁸

"Perceptual and cognitive processes are constantly in action when a person sets out to reach a destination. The environment is scrutinized on order to extract information selectively. The information describing the setting is not just passively retained. It is interpreted, structured, and integrated to the already existing body of knowledge....the environment in this process is not just "seen" but dealt with, subjugated, and above all, experienced."⁶⁹

The linking together of visual environmental 'information' when moving through physical space is the Gestalt at work in 'common movement and experience'. The process does not operate in a vacuum – we select the information according to our scope of needs which arise in relation to our purpose for being in, or moving through an environment setting and this affects our perception of the environment. The gestalt concept is important because it is inter-linked with the concept of affordance ('what's in it for me?') and this occurs in relation to our motivations.

Motivation and Expectation

We select 'ecologically significant information' with a purpose mind - whether it is to simply move forwards, or get through a doorway - we are actively seeking (and receiving) from the environment the information that will enable us to carry out our

⁶⁶ op cit, PASSINI, R, 1992

⁶⁷ ibid

⁶⁸ ibid

⁶⁹ ibid, p 160

intended actions. This is a crucial aspect of design in any setting and one that was recognised by Canter who embodied it into his theory of place in the 1970's.

Canter's 'Theory of Place'⁷⁰ states that peoples perception of, and response to places, are shaped by motivations (which are set up by goals and purposes) and expectations. On the one hand Canter's theory applies to the user, but it also applies to the designer. The information the designer *perceives* as relevant to the design activity guides the designer's eye (and hand), unless we make a deliberate effort to do otherwise. This raises a key question. If designers as human beings have evolved to perceive only the environmental information that is 'relevant' to them (because it affords the designer's own personal desires and needs), is the designer *able* to perceive information outside his/her subjective lens? It was suggested earlier that this should be possible: however, this is easier said than done - an observation made in a student design seminar highlights the problem.

During a second year undergraduate discussion group, a young landscape design student was presenting a seminar on the Bryant Park design in New York. A key attracting



Figure 3.5.vii – the moveable chairs in Bryant Park, New York City. (THOMPSON, William J, 1997, p 41)

feature of this park is the movable chairs (illustrated in figure 3.5.vii) which were being discussed. Another young, male student landscape architect stated that he did not believe that the moveable chairs had anything to do with the fact that the park is well used. Unlikely to have ever experienced the lifestyle of a city office worker wearing an expensive suit, for example, this student said that he felt it was the grassy area for sitting on that was the critical factor, and not the chairs, because (he said) this was what *he* enjoyed about a park, and he was quite adamant that he was right.

As highlighted by Pelikan⁷¹, it is unfortunate that students can enter landscape design courses as teenagers with little 'life' experience. Life experiences structure our schemata, or frame of reference, by which we experience the world. But as our life

⁷⁰ CANTER, D, *The psychology of place*. The Architectural Press, London 1977

⁷¹ PELIKAN (1992) in EATON, M, 1999

experiences change so does our perception. In the context of the applicability gap problem, it would appear that our subjective perceptions of 'reality' become distilled in our landscape training. Thus, the question arises as to how to shift our outlook. A model of perception is needed.

Models of perception

The Anthropologist Randall White presents a view on visual thinking which combines two different schools of thought on perception.⁷² It combines Gibson's holistic view of perception in terms of affordance in which humans select ecologically significant information from the environment, with another view of perception as provided by Marr⁷³. Marr presents an analytical and computerlike model of perception. He suggests that vision is a three-step process beginning with a 'primal sketch' in which a general outline is discerned, secondly the more subtle characteristics of texture and depth are perceived and final there is a realization of the complete external 3-dimensional image. This is a basic ability to think in images.

White's theory states that humans can think in a 3-d way to solve various problems, first by abstracting a concept from the environment and then by visualising designs. He uses the example of primeval man conceptualising 'pointedness' and 'barbedness' leading to the visualisation of a barbed spear for hunting animals. This recalls to mind the approach adopted by the student described earlier, who initially *conceptualised* a thoroughfare-like place ('thoroughfare-ness') which eventually led to the *visualisation* of 'the boulevard'.

White believes that it is the human capacity for translating concepts into images (visual thinking) combined with the manipulation and sharing of ideas that has led to the success of the human species. His theory fits with a general belief that although 'the image' is central to the problem solving process in design and in general life terms, people are both verbal and visual thinkers. Since the first empirical study of mental imagery published by Francis Galton in 1883 who then believed that there were two different types of thinkers – verbal and visual –current thinking is that people employ both of these faculties, and now the arguments revolve around when and how the use of one is used over the other.⁷⁴ In the context of landscape architecture, designers are

⁷² op cit, BARRY, Anne Marie Seward, 1997

⁷³ ibid

⁷⁴ ibid

occupied with *thinking* and *doing* in a visual way, utilising their spatial cognition, and communicating and sharing ideas with others in a verbal, as well as visual, way: this is the nature of design which is after all, a social activity.

Towards a new kind of knowing

Jon Lang stated that successful theories for design comprise simple but powerful generalisations about the world and 'how it operates'.⁷⁵ It is this he states that enables us to accurately predict future operations and such theories are essential for applied fields such as the environmental design disciplines. Quoting from Abraham Kaplan, Lang explains the purpose of such a theory:

"A theory is a way of making sense of a disturbing situation so as to allow us most effectively to bring to bear our repertoire of habits, and even more importantly to modify or discard them altogether, replacing them by new ones as the situation demands."⁷⁶

Useful theory in the positive approach is that which a) provides a model in the form of a combined philosophical position as well as a mental schema, and b) a theory for prediction achievable through certain actions. As suggested in A. Kaplan's quote above, 'the situation' is important in the generation of new theory, as well as the shaping of existing theory.

Meyer also stresses the need for situated theory in landscape architecture.⁷⁷ As indicated earlier, as regards the nature and role of theory in landscape architecture, it should bridge, mediate and reconcile. However, to achieve all of these things, be 'situated', and have a role to play in the advancement of the discipline, Meyer states that landscape theory must also be a product of its time:

"Theory spans, intercedes, and joins. It removes design from the isolation of the individual ego and from the service of variables, opportunities, and constraints. Theory connects built landscape form to the cares and concerns of humanity. Landscape architectural theory reconciles design form with the particulars of time and place and the aspirations and motivations of humankind. As such, situated theory enables and ennobles practice."⁷⁸

This thesis argues that in order to be able to generate bridges, mediate and reconcile social and aesthetic considerations in the landscape design process, a core facilitating

⁷⁵ LANG, Jon, *Creating Architectural Theory. The Role of the Behavioural Sciences in Environmental Design.* Van Nostrand Reinhold, USA, 1987

⁷⁶ op cit, LANG, Jon, 1987, p 14

⁷⁷ MEYER, Elizabeth 'Situating modern landscape Architecture', (1992) in: SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader.* University of Pennsylvania Press, USA, 2002

⁷⁸ *ibid*, p 31

theoretical structure is needed. It is suggested that some theory building should take place in the positivist approach to generate an organising framework together with models that can help explain and predict the landscape in spatial-behavioural terms.

3.6 SUMMARY

This chapter established that the experiential paradigm has been slowly evolving in landscape design theory through the 'language' of theorists, in both written and visual form. It identified the potential role of 'imaging' in the landscape to shift the public perception away from the 'scenographic' view of the landscape, towards seeing it as a cultural product and an intimate aspect of everyday living. However, the problem is compounded by the fact that on the one hand the public 'collective sense of place' is predominantly urban based and on the other hand contemporary landscape designers seem more adept at visualising the landscape as 'master viewer' than from the user's perspective. The thesis suggested the use of Tuan's 'side view' concept to reconcile the public/profession perception problem, and to visualise the landscape 'inside-out' from the user's perspective.

The use of internal imaging in spatial cognition was identified as a potential 'instrument for change'. Its usefulness to the landscape architect was highlighted in the form of the Lynch model, and Dee's variation of it, as a visual-spatial 'information processor/knowledge generator' (or, an 'organiser of facts and possibilities'). The use of a landscape designer's mapping, drawing and other analytical visual tools for 'doing' design were identified as being key to the process. However, because of 'evolutionary bias' designers tend to use such models to interpret their subjective, personal response to place as 'reality'. This indicates that a designer's way of 'seeing' is inadequate. Norman's 'interface' concept in conjunction with 'natural mapping', 'feedback' and the task analysis approach as used in product design together with Perin's 'behaviour circuit' theory, as conceptualised for use in environmental design, were suggested to help overcome the problem.

The product design concepts and approaches appeared to be useful in structuring a 'new kind of knowing' during the design process which can help generate a 'system image' of place. In combination with established design techniques such as spatial-sequence analysis, it was suggested that theory could be developed towards seeing the landscape

in a new way. This introduced a way in which the environment setting may be viewed through a different 'lens', but using familiar techniques. This is a lens which 'makes visible' ecologically significant information that *affords* the user with what he/she needs to carry out. For identifying these needs when the user is moving through the landscape, Lynch's 'sequential form' tool appeared to provide a useful tool at *macro*, or *regional* scale when travelling through the landscape at speed, whereas Cullen's spatial sequence technique is the key technique for landscape analysis at *micro*, or *local* scale, at the pace of walking, albeit that it needs to be applied through a more objective lens.

The disengagement of designers from positive theory building was identified as a key contributory factor to the applicability gap problem. The need for conceptual theory building in the positive approach which a) provides 'a model in the form of a combined philosophical position as well as a mental schema', and b) a theory for prediction 'achievable through certain actions' was highlighted. The importance of *situated* landscape theory that is a product of its time, and that bridges, mediates and reconciles was also highlighted for its role in advancing the discipline. It was suggested that 'a new kind of knowing' could be structured through some theory building *within*, to provide a framework, predictive models and explanatory theories for a spatial-behavioural approach to landscape design. However, there is a need for a theoretical framework to facilitate such theory generation in the first instance.

Conclusion

Towards structuring and generating 'a new kind of knowing' existing theories and concepts should be identified for their facilitating role in theory building within the experiential paradigm. Such theory should be developed in the positivist approach, towards embodying user needs evaluation *within* the landscape design process.

4.1 INTRODUCTION

This chapter presents six core ‘experiential’ theories and concepts for facilitating ‘a new kind of knowing’. These theories are highlighted as having a useful role in ordering, explaining and predicting the human experience of place. Some suggestions are made for application of the theory in the experiential paradigm, and where required, theory development will take place in the positivist approach to explore and identify ways of utilizing the theory in the landscape design process. In particular, ways in which the theory might be used to embody the user needs evaluation *within* the visual-spatial approach, are examined. The chapter concludes by summarising a facilitating conceptual framework for an approach to landscape design *with the user in mind*.

4.2 TOWARDS A NEW KIND OF KNOWING

Six core ‘experiential’ theories are highlighted. These are: 1) Norman’s ‘System image’ model; 2) Canter’s ‘Theory of Place’; 3) Lynch’s ‘Theory of Imageability’; 4) Passini’s theory on ‘imaginary wayfinding’; 5) Appleton’s ‘Four primitive behaviours’; and 6) The Kaplans’ ‘Exploration-and-Understanding’ matrix. The first three theories may be considered ‘static’ models for design, whilst the latter three are ‘dynamic’ theories and tools for explaining and describing the landscape from the users’ perspective (the ‘side view’). Collectively they provide a combined aesthetic/ biological/ cultural/ perceptual theoretical model for design.

4.2.1 System image of place (Norman)

The feedback principle has been highlighted as important in design for integrating a user-needs centred approach. To facilitate the use of such a concept Norman suggests that designers need conceptual models for ‘evaluation and execution’. He suggests that such models should make visible the causal relationship between the environment and the behavioural effects and thus allow us to predict the effects of our actions.

Conceptual models in design are an aspect of mental modelling theory which explains that people have models of themselves, of others, the environment and of the things they interact with. This presents a design problem which is illustrated by Norman below:

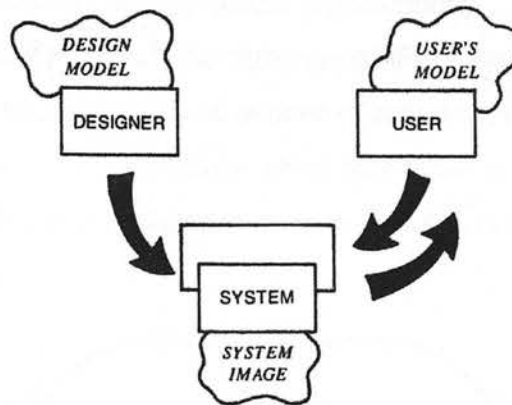


Figure 4.2.1 - A conceptual model of the 'system image'. (NORMAN, D, 1998, p 16)

The above figure shows the two mental models which the designer must unify in order to produce a satisfactory 'system image' – that is the visible part of the 'device': put more simply, the design. Norman's argument is that the very building of the conceptual model of 'the system image' is the act of building evaluation into the design process, but the designer needs to be able to perceive the design problem from the user's point of view. In the context of the behavioural science/landscape design gap problem, this thesis emphasises the need for concepts that will help landscape architects to know *how* to produce such an image, and to know that it is reasonably accurate.

4.2.2 Theory of Place (Canter)

In his seminal work Canter presented a 'Theory of Place' which expressed the transactionalist perspective¹. This was a perspective that began to take shape approximately forty years ago in what was then termed 'ecological' psychology (now termed environmental psychology).

The transactionalist approach was based on a conceptualisation of the human occupied environment as a two-way relationship in which there is a cause-and-effect transfer between individual and environment. In this conceptualisation, the 'environment' is

¹ CANTER, D, The psychology of place. The Architectural Press, London 1977

conceived of in 'ecological' terms and transactionalism provides a way of explaining the mutual relationship humans have with their environment.

Canter used three categories to define place: a) physical attributes; b) the activities people engage in (behaviour); and c) people's perceptions. Canter conceptualises 'place' as an holistic unit in which the three constituents are interrelated. Using this approach suggests that places are viewed as units of activities, where physical form both *facilitates* and symbolises the interactions which take place in it, and the activities and meaning attached to the place are shaped by both the physical form and the goals and purposes of individuals.

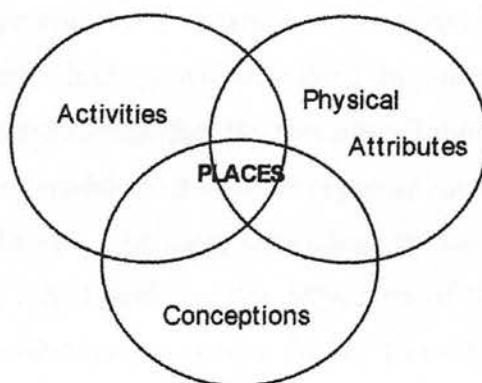


Figure 4.2.2 - Canter's conceptualisation of Place (CANTER, D, 1977, p 158)

4.2.3 Theory of Imageability (Lynch)

Lynch was a pioneer in developing theories and methods for dealing with the landscape in terms of all three of the place attributes set by Canter – namely, physical, behavioural

and perceptual attributes, although he is mostly renowned for his perceptual approach because of the establishment of 'The image of the city' and his theory of imageability. Despite its arguable limitations, in design, it provides an imageable concept and a theoretical 'hook' for new concepts.

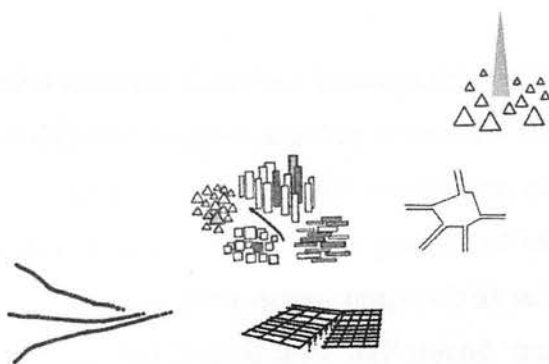


Figure 4.2.3 – Lynch's five landscape elements: a landscape model for design (derived LYNCH, K, 1960)

Lynch developed his theory of imageability from his findings about the way people perceive place. The five elements of path/edge/landmark/node/district effectively provide a 'landscape model' which designers are able to use. As a visual representation of people's collective perception of place this model provides a usable tool in the form of a usable 'mental structure' for designers to use in their own design process. As Lynch himself states:

"it [the environmental image] can serve as a general frame of reference within which the individual can act, or to which he can attach his knowledge. In this way it is like a body of belief, or a set of social customs: it is an organizer of facts and possibilities."²

As suggested earlier, Dee provides a variation of the model that is more suited to the 'loose' landscape setting which is not structured by streets lined with buildings. Significantly, Dee's space/path/edge/foci/threshold/detail model may be considered in the same terms as Lynch's model - that is, as an organisational framework for gathering and categorising information. As such, depending on the particular setting under analysis, the Lynch and Dee models provide organisers of 'facts and possibilities' (to paraphrase Lynch) and analytical tools where the key elements of path, edge and so on become organising principles for design. Such organisers provide tools for exploring design solutions since analysis and synthesis are commutatively linked in the design process. Therefore, this thesis suggests that the Dee/Lynch models are centrally important to the landscape architect's design process for providing an interpretive analytic and creative framework for design.

4.2.4 'Imaginary wayfinding' and 'imagined behaviour' (Passini)

Passini makes a direct link between the wayfinding activity and the design process. He describes how humans simulate or rehearse their route ahead in physical space mentally, before actually executing the wayfinding activity in reality, suggesting that a good designer is able to mimic this process of internal simulation – literally simulating a walk-through of their design proposals as laid out on plan or in sketch form - in their minds and thus finding their way around 'imagined' space.³ Passini states a designer, just as a wayfinding person walking through real space, produces an image of place.

² DOWNS, Roger, M and STEA, David, *Image and Environment. Cognitive Mapping and Spatial Behaviour*. Aldine Publishing Company, Chicago, 1973, p 302

³ PASSINI, R. *Wayfinding in Architecture*. Van Nostrand Reinhold, New York, 1992

Designers using the mental modelling process to construct and explore design ideas internally before externalising them using visual graphical techniques. Passini describes this process as 'imaginary wayfinding'.

There is distinction between wayfinding and orientation. A person who cannot establish his position in space can still find his way around.⁴ Also we may be spatially orientated, but we may not be able to reach a destination. Wayfinding, unlike orientation, involves the ability to process information and organise it spatially into a cognitive map, or it might simply be the ability to follow instructions precisely. The creation of cognitive maps is difficult because it involves an ability to spatially make sense of one's environment. Passini proposes a definition of the spatial and cognitive processes involved as comprising three distinct abilities:

"a cognitive-mapping or information-generating ability that allows us to understand the world around us; a decision-making ability that allows us to plan actions and to structure them into an overall plan; and a decision-executing ability that transforms decisions into behavioural actions. Both decision making and decision execution are based on information generated by cognitive mapping."⁵

Thus, our information building generates our understanding, our decision making enables us to plan and our decision executing allows us to take action. For wayfinding, Passini uses 'the decision' as the unit for analysis. He states there are two types of decision: one which leads directly to a behaviour, or action, and the second type that leads to behaviour (action) via the mediation of other decisions. In the context of environmental design, the routes, the layout and circulation define the wayfinding problems people will have to solve, whilst the graphic communication provides the user with the information to solve the imposed problems. However, as highlighted by the Kaplans, not only do we take our wayfinding cues from signs, but we respond to the environment itself – both its structural layout (configuration) and its constituent elements (content).⁶ In wayfinding, as with the design process, we separate out structural form from content.

⁴ op cit, PASSINI, R, 1992

⁵ ibid, p 96

⁶ KAPLAN, Rachel, KAPLAN, Stephen, RYAN, Robert, L, With People in Mind. Design and Management of Everyday Nature. Island Press, USA, 1998

The decision model Passini conceptualises can be used to help model a thinking approach which the current research enquiry, and any future enquiries, might use to develop spatial-behaviour theory that is relevant and therefore useful to the design process in landscape architecture. Passini conceptualises the entire process in the form of a decision tree diagram, which as shown in figure 4.2.4 (b) below is set against a time line: the further on we are in our 'journey' (or, interchangeably, the design process) the more our knowledge builds up, and so the decisions become more complex as our understanding of the environment becomes more comprehensive and detailed. As a result a hierarchy of decisions emerges. The example illustrated in figure 4.2.4 represents a fictitious scenario of a South Sea sailing trip to Turtle Atoll.

- | | |
|------------------------------------|---------------------------------------|
| D to go to Turtle Atoll | DD to turn rudder to the right |
| D to sail to Coral Reef | DD to reset sails |
| D to follow Reef to Big Dip | DD to relocate occupants |
| D to home on Turtle Atoll | DD to plait a cord |



The fictive voyage to Turtle Atoll.

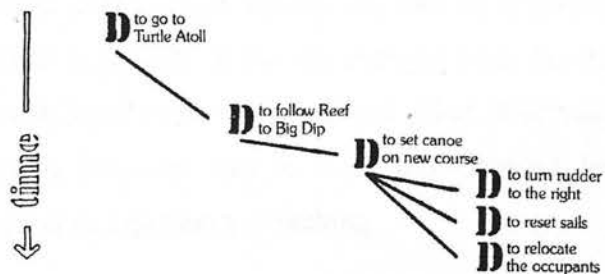


Figure 3.2
Decision hierarchies

a) '**D**' in bold print represents the 'static' decision (structural), whilst the unemboldened '**D**' represents the 'dynamic' decision (a procedural set of actions).

b) A decision-making hierarchy of the fictitious voyage, in the context of time.

Figure 4.2.4 - A fictitious voyage to Turtle Atoll (PASSINI, R, 1992 , p 63-64)

Early research on wayfinding looked at how native peoples in the South Seas managed to retain spatial orientation when navigating their way through oceans without any

specialist navigation equipment.⁷ Research found that such people did not rely entirely on a spatial representation of the physical environment, but rather on a plan of action or a strategy to go somewhere. On the one hand these people needed a 'static' plan (or mental map as 'product') and on the other they needed a 'dynamic' set of actions (mental map as 'process'). Research found that only if deprived of both, did the person lose spatial orientation. With the environmental design process, similarly, there is a need for both a static 'model' of action together with a 'dynamic' set of actions, or tasks. Therefore, Passini suggests that the concept of 'imagined behaviour' might be used as a model for decision execution in the spatial problem solving process in environmental design.

It is notable that in imaginary wayfinding (and/or the design process) Passini states that internal simulation can never be as detailed as the real experience. Thus although the process can be used to assess the possibility of a solution by mentally executing plans, it has its limitations. In the absence of feedback from the real world situation, there is limit to knowing how imagined scenarios can be successfully followed through in the mind alone. In the example of the sailor going to Turtle Atoll, although he begins with a simple plan 'to go', it then becomes more detailed 'to go follow Reef to Big Dip', and so the detail increases as the tasks to be executed in order to get there, become more specific. This is because of his active, bodily engagement with the real world situation ('to turn rudder to the right', 'to reset sails'). Such actions can only be planned for in and executed in detail once the sailor is actually in the sea engaged with the elements and responding to the informational input from the wind and other observable and experiential conditions. This thesis proposes that it is at this detailed level of human/environment understanding that design theory is lacking.

This thesis suggests that the utility of 'imaginary wayfinding' in the design process is most effective when applied through 'role play'. For example, if a designer who is based in Edinburgh is trying to design a walking route down from the Alhambra palace in Granada (Southern Spain), she can identify a 'typology of use' that exists in Edinburgh because the arrangement is similar. The experience of finding one's way from Edinburgh castle down to the bottom could be 'lived out' by walking through the experience, albeit in a different cultural context, but through the use of imagination, (and ideally through knowledge gained on an initial site visit), problems, and potential

⁷ op cit, PASSINI, R, 1992

solution types, can be worked through at a level of detail our internal simulation devices would be unable to achieve. Thus, the design can evolve whilst moving between drawing board and real life even if the site cannot be constantly returned to. The utility of this approach can also be imagined for use where the site currently exists as an empty wasteland for example. By testing and re-testing the design in this 'evaluation in action' approach, the method uses 'the self' to test the design.

4.2.5 The Kaplans' understanding and exploration preference matrix

Rachel and Stephen Kaplans are significant contributors to the debate on landscape preference. Adopting a psycho-evolutionary perspective, they conducted research within the paradigm of thinking shaped by Appleton which states that certain environmental configurations can be universal predictors of preference. The wide preference for natural environments over built ones emerged in numerous studies which explained this in biological and evolutionary terms. This consistent liking for nature is explained by the Kaplans in information-processing terms.⁸

The Kaplans present a landscape preference model intended for use in landscape design (figure 4.2.5.i). This represents a theory of landscape preference in the area that lies between 'behaviour' and 'perception' - which this thesis identifies as the experiential paradigm. A behavioural/perceptual approach to landscape study had already been established by Lynch who described the landscape as a *sensed* environment. In order to look at the sensed environment Lynch stated that we must study two human aspects of it: how people conceive of it and how they act in it (Managing sense of region). The Kaplans' 'preference matrix' provides one such model.

The Kaplans' model explained

The Kaplans' model is an 'understanding-and-exploration' framework of thinking intended for the design and management of the 'natural' environment.⁹ The Kaplans present their matrix as an approach to understanding the landscape as a source of environmental information. It considers the landscape in terms of its potential for *understanding* and/or *exploration*. Central to the theory is that environmental

⁸ SINHA, Amita (ed), "Landscape Perception Readings in Environmental Psychology", London Academic Press, 1995

⁹ KAPLAN, Rachel, KAPLAN, Stephen, RYAN, Robert, L., With People in Mind. Design and Management of Everyday Nature. Island Press, USA, 1998

information provides cues which enhances a user's ability to understand and explore it, and this has much to do with its content (ie the things in it) as its configuration (ie its organisation).

Preference Matrix		
	UNDERSTANDING	EXPLORATION
2-D	Coherence	Complexity
3-D	Legibility	Mystery

Figure 4.2.5.i - The Kaplans' Preference Matrix (KAPLANS, R and S, 1998, p 13)

The matrix consists of four environmental 'information' factors which become operational in different 'planes' and in different combinations. This model is intended to provide designers with 'a way of thinking' about places based on environmental preference, and is an attempt to address the knowledge gap between research in this area and its practical application in design.

In the preference matrix, according to the theory, coherence and complexity come into play in the 2-dimensional 'plane', whilst legibility and mystery come into play in 3-dimensions. Here, the concept loses something of its original theory. The original terms had described environmental perception as primary and secondary levels. These were levels that the human progressively understands more about the environment as he moves 'deeper' into the scene. By referring to the two planar aspects of the landscape as the 'picture plane' (2-dimensions) and the 'deeper scene' (3-dimensions) respectively, the concept excludes the fourth dimension of movement through the landscape. This can only emphasise the idea of landscape as a 'scene' to be viewed (the 2-d 'picture plane'), rather than something experienced. And so, the original meaning behind the theory has lost something during the process of its articulation from research into design. The concepts embedded in the Kaplans theory will now be discussed in relation to their utility in the design process for constructing 'a new 'ways of seeing' the landscape. These are identified as a) legibility, b) mystery, c) affordance and d) complexity.

a) Legibility

As highlighted earlier, 'legibility' in the landscape was embodied in design by Lynch in his theory of imageability as the human ability to make sense of the environment visually and later, as a result of research such as the Kaplans, writers on the design of public space such as Carr et al, refer also to its informational quality. Examples cited earlier suggested that a legible entrance for example should not only be clearly (visually) entrance-like but it should also suggest to the user what is going on inside – that is there should be a legibility of use. In the Kaplans' model coherence in the general landscape configuration, and legibility in its specific contents, work together to provide information that can help with making sense of the environment.

Passini describes legibility as the ease with which environmental information is obtained and understood, whilst imageability is described as the ease with which a place is spatially comprehended and mentally represented. A key aspect of this is the concept of 'expected image' and that humans are actively seeking informational input from the environment whilst passively receiving it: we often only see (that is, perceive) what we expect to see. This process in turn is influenced by the associations we make based on the type of information received previously either in our generic models of the way the world works or in immediate memory: for example if we have been following a series of brown signs saying 'Countryside and Forest recreation', which suddenly switch to green signs saying 'Afan Argoed Forest' we can become confused.

b) Mystery

The concept of 'mystery' to the landscape architect is perhaps most often associated with Cullen's theory of place where he suggests its role in visually communicating that 'anything might happen' here. Similarly, in the context of the Kaplans' work, mystery refers to the informational cues that suggest there is more to be seen. Mystery works in conjunction with complexity, which in turn is interlinked with the way we perceive the environment – in particular the elements within it, or its content - in terms of what it *affords* us.

c) Affordance

Research on environmental preference categorises the content of landscape settings into the 'general' and the 'specific', based on the idea that there are primary and secondary

versions of environmental affordances in the environment.¹⁰ Herzog equates the specific contents of a landscape with S Kaplan's 'primary landscape qualities' such as water, foliage and trees which have a very specific and fundamental evolutionary bias in terms of human survival. Herzog distinguishes between primary and secondary qualities in the context of 'refuge and spaciousness': he suggests spaciousness is the primary factor (the feeling of depth conveyed by a setting and the feeling that one would have to go a long way to reach its farthest point) whilst 'refuge' is a secondary factor (how much the setting provides the opportunity to hide).

The primary/secondary factors that come into play in landscape preference present both a design problem and an opportunity. On the one hand preferences are determined by our evolutionary bias to 'nature' where our information processing capabilities are conditioned towards survival in a non-urban environment, and yet this is where we choose to live and spend much of our leisure time in the developed world. This presents a contradiction: we say we like one thing, but we do another.

A classic example of the saying/doing contradiction is that people will go to a busy public park to 'get away from it all'. This was a point made by a Forest Recreation officer (Dalby Forest, England) in trying to get know more about what people liked, and did not like, about his own forest park¹¹. He wanted to understand why people say this when sitting in or by their cars in a busy car park, looking out across a large grassy area banking down to a stream at his site. He came to the conclusion that "it's the beach experience, but here in the forest". This would indicate that it is a certain *type* of experience people were seeking when they visited Dalby Forest. If this is the case, it is an experience that is *primarily* to do with gaining a 'beach-like' experience (albeit unconsciously) – an experience to do with sitting outside in the sun, eating ice cream, playing by the water's edge and so on, and *secondarily* to do with the forest. **Plate 4.2** attempts to visually summarise 'the essential character'¹² of this place in terms of the landscape experience this setting provides (using researcher's own photographs).

¹⁰ HERZOG, T R in: op cit SINHA, Amita (ed), 1995, pp 65-81

¹¹ FINDLAY, Dr C, SOUTHWELL, K, WARD-THOMPSON, Catharine, ASPINALL, Peter, "Effectiveness of Wayfinding Systems with Forest Users. Phase One: A Site-Specific Scoping Study", Report to the Forestry Commission, Landscape Design and Research Unit, School of Landscape Architecture, Edinburgh College of Art, Heriot-Watt University, January 2001

¹² (to paraphrase Patrick Geddes)

Dalby Forest



Plate 4.2 – A visual summary of ‘the essential character’ of a place (Dalby Forest).

d) *Complexity*

Environmental preference, perception and complexity are interlinked:

"The many environments in different areas, eras and cultures which are liked and preferred have one thing in common: they all seem to be perceptually interesting, complex and rich."¹³

Complexity is a key concept in a growing area of interest in wayfinding research. Wayfinding is an area which Passini predicts will take on increasing importance as designers build increasingly larger and more complex environments such as hospitals and shopping malls¹⁴. Good wayfinding-ability in a place is important because it is interlinked with environmental stress, which is a particular problem in modern society.

As already identified by Lynch in his early research on mental mapping:

"Let the mishap of disorientation occur and the sense of anxiety and even terror that accompanies it reveals to us how closely it is linked to our sense of balance and well being. The very word "lost" in our language means much more than simple geographical uncertainty: it carries a tone of utter disaster."¹⁵

The complexity concept embodies ambiguity. It exists in relation to simplicity and environments that are too complex become confusing and thus stressful, but equally environments that are too 'simple', or characterised by sameness, are also confusing. In terms of design and in answer to the question of 'how complex' an environment should be, Passini concludes that the usefulness of complexity in the environment is relative to a person's wayfinding purpose. When we have time on our hands, we respond positively to the challenge of finding our destination because efficiency is not an imperative – such as when we are on holiday exploring a new place. At the other extreme in the emergency situation such as the need for a fire escape:

"Lack of time, stress, and the possible impairment of information-processing and decision-making capacities, determine that nothing can be too simple or too "straightforward".

The potential of the theory

In evolutionary terms we have not had very long to adapt to an urban way of living and this presents humans with a problem. This is helpful to know in design because it helps

¹³ RAPOPORT, Amos (1977, p208) paraphrased in Passini 1992

¹⁴ op cit, PASSINI, R, 1992

¹⁵ LYNCH, Kevin, *The Image of the City*, The MIT Press, Massachusetts, USA, 1960, p 4

reduce the scope of user needs. Since we are 'human animals' with basic needs, wants, desires, and expectations that stem from our primitive biological landscape preferences, this narrows the scope of the design problem.

The essential concept behind the Kaplans' understanding and exploration model is that the more we explore, the more we understand. This thesis suggests that the model may be useful to design as a spatial/behavioural tool within the experiential paradigm, where it may be used for the specific purpose of analysing the landscape in terms of its affordance for 'exploring'. This is an activity that takes place when moving through a landscape, and therefore the thesis suggests infusing the model with an indication of movement through space. In this way the landscape can be analysed for its legibility of *use*.

This is a very specific application of the model and contrasts with its more generalised application for landscape design as presented by the Kaplans' matrix. For its application with user intent in mind, its integration with the Behaviour Circuit concept is suggested. The behaviour circuit concept allows specific activity streams to be decomposed. The activity of exploring is an activity type that is distinctly 'modern' in contemporary leisure seeking society. 'Exploring' is distinguishable from other forms of wayfinding (where the user's intention is find the destination point as quickly and efficiently as possible) to the exploring type where the user responds positively to the challenge of finding, or even inventing a destination, because efficiency is not an imperative. The explorer uses the environment in order to understand, and in order to understand he seeks to explore.

The thesis proposes that the exploration/understanding model may be adapted as indicated in figure 4.2.5.ii below. The thesis suggests that articulation of the theory in this way is more useful to landscape architects for helping to interpret a landscape for its affordance in relation to 'exploring', *when moving through it*. To this end, the thesis suggests its use in conjunction with the spatial sequence technique – whether in Cullen-esque or Lynch style –for facilitating the infusion of behavioural analysis in spatial analysis.

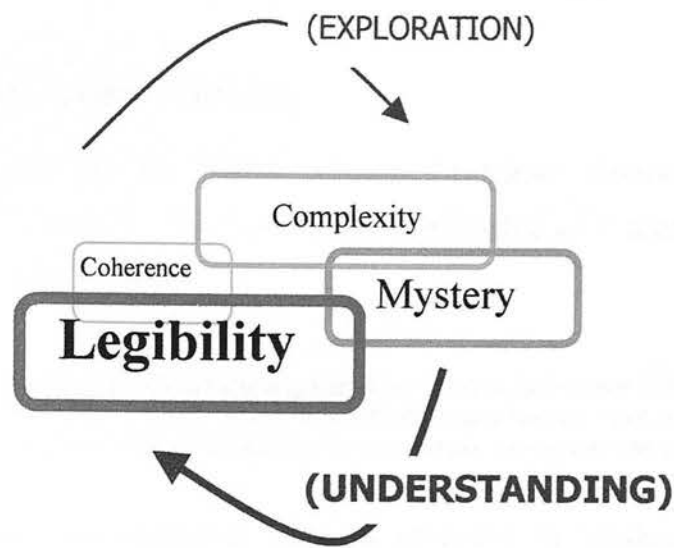


Figure 4.2.5.ii - A diagram illustrating a potential development of the Kaplans' preference theory on understanding and exploration to capture the 4-dimensional aspects of time and movement through space.

The original 'static' version of the Kaplans model is adapted to the above 'dynamic' version by the addition of some arrows indicating a sense of movement through space. This also indicates a progression from initial perception when first impressions are gained ('coherence') towards attaining a 'deeper' understanding of an open space setting progressing through the understanding/exploration sequence from 'complexity', 'mystery' to 'legibility'. For this the font size of the lettering is increased depending on the importance of the concept to depth of environmental understanding (the larger the letter, the greater the depth), and this is intended to add a sense of 'perspective'. In addition, the cyclical nature of the understanding/exploration model is emphasised since in this model, the more one explores the more one understands, and the more one understands, the more one explores. Legibility is thus emphasised as the key design consideration and criteria for quality in a landscape which affords the designer with the ability to 'explore'.

As identified by Lynch and Schulz, 'the path' is the most important landscape element in experiential space. This enables us to move through it and therefore to build up our knowledge of it. As already identified, it is movement through the landscape that enables us to build up a picture of it and this in turn enables us to 'use' it. For analysing the navigability of a route Lynch suggested a 'View from the Road approach', whilst Christopher Alexander suggested his 'paths and goals' ¹⁶.

¹⁶ ALEXANDER, Christopher, *A Pattern Language: towns, buildings, construction*, Oxford University, 1977, pp 586-7

4.2.6 Four primitive behaviours (Appleton)

Habitat Theory asserts that the relationship between the human observer and the perceived environment is basically the same as the relationship of a creature to its habitat.¹⁷ Furthermore, it asserts that

“the satisfaction we gain from contemplating this environment (which we call ‘aesthetic’) arises from ‘a spontaneous reaction to that environment as a habitat, that is to say as a place which affords the opportunity for achieving our simple biological needs.”¹⁸

The general concept of basic biological needs is grounded in Maslow’s theory. Maslow conceptualised a universal theory hierarchy of needs¹⁹ which *motivate* us to take certain actions (figure 4.2.6.i).

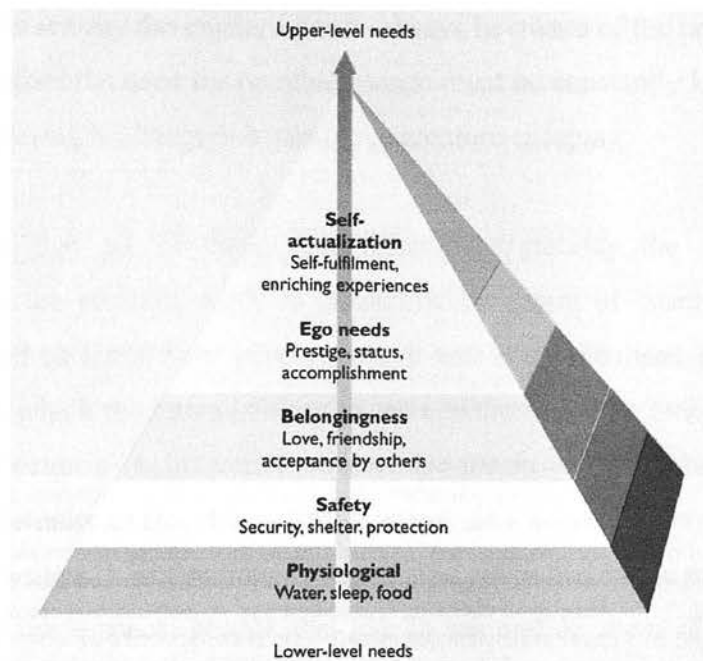


Figure 4.2.6.i - Maslow's Pyramid of needs. (SOLOMON, Michael et al, 1999 p 98).

The hierarchical approach implies that the order of development is fixed (that is, a certain level must be attained before reaching the next) towards attaining our ‘peak experience’ at the top of the pyramid²⁰. This is a general model which can be, and is, utilised in many areas of study. As a basic concept this is relevant in any context, in any setting.

¹⁷ APPLETON, Jay, The Experience of Landscape. Revised Edition, John Wiley & Sons, England, 1996

¹⁸ *ibid*, p 63

¹⁹ MASLOW, Abraham, H, Motivation and Personality. 3rd Ed, Harper Collins Publishers, 1970

²⁰ SOLOMON, Michael et al, Consumer Behaviour: A European Perspective. Prentice Hall Inc, USA, 1999

Appleton reduces the scope of user needs to four primitive kinds of behaviour that the creature is engaged in, namely, hunting, escaping, shelter-seeking and exploring. Exploring is defined as the ‘master activity’ (or to use Maslow’s terminology, the ‘peak experience’) which lies behind the successful accomplishment of the others. Once the creature has fed (hunted) and made shelter, and if he is not busy escaping from predators, he is free to explore his environment. However, this is not purpose-less – this is a necessary activity in order to learn more about his environment in order that he knows where his future hunting/escaping/shelter-seeking opportunities (affordances) lie.

Exploring is observable in all the higher animals. The creature exploring is seeking to acquaint itself with the widest range of options to exploit its environment so that, if the necessity arises, it can act from a basis of information and not of ignorance. But even in the course of this activity the creature has to always be aware of the possibility of some hazard and therefore the need for possible escape must be constantly kept in mind: thus the creature exploring is always potentially the creature escaping.

Appleton states that all of these four behaviours embody the ‘prospect-refuge’ condition, since the creature needs to constantly be aware of ‘seeing without being seen’. It should be noted that prospect-refuge was conceptualised by Appleton as a phenomenon by which the human ability to see and the ability to hide are important in calculating a creature’s (a human’s) survival prospects. Where the human has an unimpeded opportunity to see, it is called prospect, and where he has an opportunity to hide it is called refuge. It is also notable that Hillier states that in the modern context of use, in order to use a space, people also like to see and *be seen*. This thesis would suggest that the relevance of theory is dependent on the user’s *purpose* for being in a space, the nature of the space itself, and other experiential and cultural factors. This issue of utilising behavioural theory and concepts of place in its context of use, will be returned to later in the thesis. The point of discussion here is to explore the potential *facilitating* role of the four ‘primitive behaviours’ towards ‘a new kind of knowing’.

To place the four behaviours in the context of modern British living, as observable in everyday outdoor spaces, these are:

1 Hunting: we no longer hunt down our prey, we buy it in a shop and take it home to cook, or go to a restaurant. From a landscape design perspective this relates to outdoor eating: people who are out and about who are seeking a place to sit out are also escaping/seeking shelter (somewhere warm, dry and away from noise and other pollution).

2 Escaping: our modern day predator is stress. Environmental stress includes pollution (air or noise), congestion (crowding or traffic), too deserted (threatening); also it might be that the environment is difficult to negotiate through lack of orientation (confusion, uncertainty), lack of seating (uncomfortable) or dirty/too wet/too hot/too windy (unpleasant/uncomfortable), and so on.

3 Shelter seeking: this interlinks with hunting and escaping: spending time in an outdoor place often includes seeking out a place to sit/stand/wait/meet/chat and maybe eat/drink; we need to be warm and dry, see other people around, feel safe (not threatened) and comfortable (eg a seat with a back rest).

4 Exploring: as the master activity, in the modern day context this is what we do on holiday or in our leisure time, and in contemporary life leisure time is the free time we have in between or even whilst working/shopping, which might entail simply window shopping (browsing) or it might be seeking out a new café, shop or other place (looking/finding) or simply stopping to look at something that caught our eye (gazing/viewing/seeing).

Wayfinding is a distinctly modern activity and closely related to 'exploring'. According to Passini the activity is distinguishable from exploring because there is a need to be at a particular destination within a particular time scale.²¹ Perhaps most significantly, is the fact that in wayfinding there is a particular target destination in mind because in exploring we are less direction oriented but rather 'finding out the extent of the information given'²². However, what links the two is the notion of finding.

Canter et al's study referred to earlier, had revealed the existence of a number of types of searching in hyper-space, and provided definitions for, 'Scanning' 'Browsing',

²¹ op cit, PASSINI, R, 1992

²² CANTER ET AL (1985) in: McALEESE, Ray (Ed), Hypertext. Theory into Practice., Intellect Ltd, UK, 1999

Searching', 'Exploring' and 'Wandering' 'exploring'. The suggestion, given Appleton's theory and the Kaplans' emphasis on 'exploring in order to understand', is that in physical space exploring is the 'master activity' and all its variations could be subsumed within this broader category.

The potential of the theory

In the modern context, where people spend more and more time in unfamiliar environments, aspects of 'exploring' such as 'wayfinding', 'browsing' and its other variations, are key behavioural considerations in the design process.

Aspects of 'Exploring'

The earlier pioneer thinkers of the 1960s/70s identified *familiarity* with environment as a key determining factor in defining 'exploring'. Notably, in discussing the results of a survey of visitor behaviour in an art museum, Goodey reported on a distinction that Bechtel had made between *exploratory locomotion*, (exhibited in those who are unfamiliar with an environment) and *habitual locomotion* (observable in those who are familiar with a setting).²³ This is because to those who are unfamiliar with a place, the environment is prominent, and people are open and receptive to it, exploring it, and looking for stimuli. Conversely, those who are familiar with their setting, move in an habitual way, because paths are known and followed without observation of the environment which remains in the background: "It is the difference between finding one's way ... and moving almost automatically..."²⁴.

Browsing is a variation of exploring that, if we are to go on Canter et al's definitions, is distinguished by the desire to follow a path until a goal is achieved. McAleese points out that the phenomenon of browsing is no different whether walking along a street window shopping, or browsing through hyperspace because the cognitive processes are the same.²⁵ In both wayfinding and browsing, we exhibit similar behaviours: we begin with an intent (a purpose), whether to look up some details in the library, to walk somewhere, or look at something in a shop window, but essentially we have some kind of purpose. In these two activities there is a goal in mind but in browsing the goal is yet to be discovered. Similar to wayfinding, when browsing, and also exploring, we are not

²³ BECHTEL 1967, in: GOODEY, B, "Perception of the environment: An introduction to the literature." Occasional Paper no 17, Centre for Urban and Regional Studies, UK, 1973

²⁴ *ibid*, p 34

²⁵ *op cit*, McALEESE, Ray (Ed), 1999

only seeking out information but we are also being given it – or at least receiving it – from the environment setting. The person browsing the content of the shelves of a library (the books) is an obvious example, another is the shopping experience (browsing the goods). But with browsing we are distracted by other seemingly purposeless browsing activities, eg we spot another book on the library shelf, or something along the street that attracts our attention, and however much we might seem distracted we are effectively following the same train of thought, whether this is be a library search, shopping for a specific object, seeking out a specific place or simply sightseeing.

According to McAleese, searching the library or supermarket shelves is an example of browsing in its simplest form. Browsing uses associations or links to determine the next item to be accessed, or found. It is a purposeful activity in the sense that there is a felt information need or interest, even though it may seem apparently purposeless. Thus, in the context of real space, when ‘browsing’ through the streets of an urban place we constantly set goals, or landmarks to reach ahead, but in between, we ‘wander’ as the goals keep shifting. This was illustrated by Alexander in his pattern analysis of people acting like ‘pinballs’.

To draw together all the strands of thought on ‘exploring’ towards theory building which can, firstly, raise a designer’s awareness of the complexities of user/environment interaction at this proposed *detailed* level, and secondly, help designers utilise the knowledge, figure 4.2.6.ii below conceptualises a model which describes the types of behaviours which would appear to be subsumed in exploratory behaviour (the master activity according to Appleton) in the modern day context. These are relevant to environmental design in general since people are more often operating in unfamiliar environments, and more complex environment settings (such as leisure and shopping complexes), than ever before.

Four behavioural variations of ‘exploring’ are conceptualised in a ‘side-view’ diagram of ‘aspects of exploring’. There is a hierarchy at work where the closer we are to ‘finding’ (to the right of the diagram), the more we are bodily engaged with the environment, whereas at the other end of the scale (to the left of the diagram), when ‘wandering’ we are not so much finding our way as ‘seeing’ and ‘looking’ and generally searching. Although wayfinding (in the physical world) is distinguishable from

exploring by the need to be at a particular destination, and according to Passini, within a particular time scale, the common factor of ‘finding’ is emphasised.

The exploratory behaviours ‘side view’ model is suggested to help designers take into account the complexity of environmental experience. Although this is by no means ‘complete’ and absolute, the general idea of such a model is to help designers analyse the landscape, and their design decisions, at the detailed level of the real-life human experience. In conjunction with a task-based analysis approach, as described earlier and as adopted in product design approaches, and as described by ‘behaviour circuitry’ such a model could help the designer examine the ‘usability’ of a place, simply by

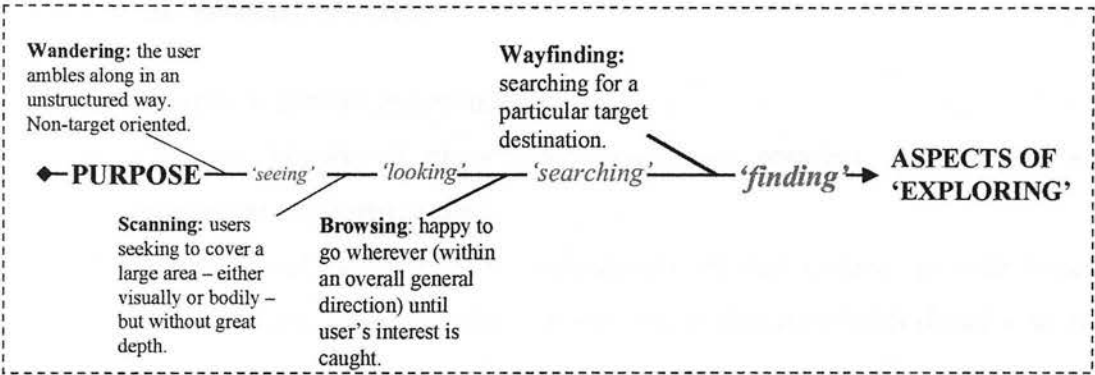


Figure 4.2.6.ii - Four behavioural aspects of ‘exploring’ in the modern context, derived from Appleton’s four ‘primitive behaviours’ model: the diagram conceptualises a hierarchy where the closer we are to ‘finding’ (to the right of the diagram), the more we are bodily engaged with the environment whereas at the other end of the scale, when ‘wandering’ we are not so much finding our way as ‘seeing’ and ‘looking’.

understanding the different user intent when say ‘wayfinding’ as compared with ‘browsing’. Finally, the behaviours model in figure 4.2.6.ii may be the type of development needed towards helping designers understand the landscape experience in ‘detail’, as introduced earlier as an element of the Dee ‘model’, to help structure spatial analysis for a more focused look at its content in relation to its background spatial form (as structured by its *paths/ edges/ foci/ thresholds*) or interchangeably Lynch’s *path/ edge/ landmark/ node/ district* model, towards a user-centred approach to design.

4.3 STRUCTURING A USER-CENTRED APPROACH TO LANDSCAPE DESIGN

This chapter concludes with a theoretical framework for placemaking. **Plate 4.3** illustrates a pictorial summary of the core concepts, tools and techniques identified in this chapter for a user centred approach to design in the experiential paradigm. Collectively these provide a ‘thinking machine’, that is, a set of ‘thinking’ and ‘doing’

tools which are expected to help designers 'see' through a more objective lens, towards generating an accurate 'system image' (from the 'side view'). In this way, user needs evaluation is introduced to the design process using a combined product design/landscape approach.

The tools may be categorised as 'static' and 'dynamic' tools: the former grouping provides concepts of place (these are the core facilitating theories) whilst the latter grouping provides a set of 'actionable' techniques for *thinking* about the user (theories with utility in embodying user needs evaluation within the design process) whilst *doing* design (basic techniques for spatial sequence analysis):

1) **'Static' concepts of place:**

- Norman's 'system image' model;
- Canter's Theory of place which combines physical, behavioural and perceptual attributes of place;
- Lynch's *path/edge/landmark/node/district* model (which is transferably Dee's version of the model - *paths/edges/ foci/thresholds/detail* - in the 'loose' landscape setting): this is for use as an 'organiser of *spatial* facts and possibilities';

2) **'Dynamic' techniques for:**

i) 'thinking' about the user:

- Newman's 'interface' concept (embodying 'natural mapping' and the feedback concept);
- a dynamic version of the Kaplans' understanding and exploration model;
- a model of 'basic behaviours' derived from Appleton's biological/aesthetic theory;

ii) 'doing' design (spatial sequence analysis):

- Lynch's sequential form;
- Cullen's spatial sequence.

Whilst the interface concept provides the 'viewing lens', spatial sequence analysis remains the key design activity for landscape analysis in the experiential approach. The

framework is incomplete since there remains a need to strengthen theoretical links between spatial and behavioural thinking. Thus, there is a need to further explore concepts derived from the behavioural sciences to identify those that may become incorporated into the overall framework.

Conclusion

The theoretical framework shown in **plate 4.3** reconciles aesthetic/ biological/ cultural/ perceptual perspectives, and provides a facilitating structure for a user centred approach to landscape design in the experiential paradigm. This provides a groundwork for further theory building to provide predictive models and explanatory theories for integrated spatial-behaviour analysis.

Building on the groundwork presented in this chapter, behavioural science concepts highlighted by other researchers as being useful to landscape architects, and their compatibility with the visual-spatial approach, will now be discussed.

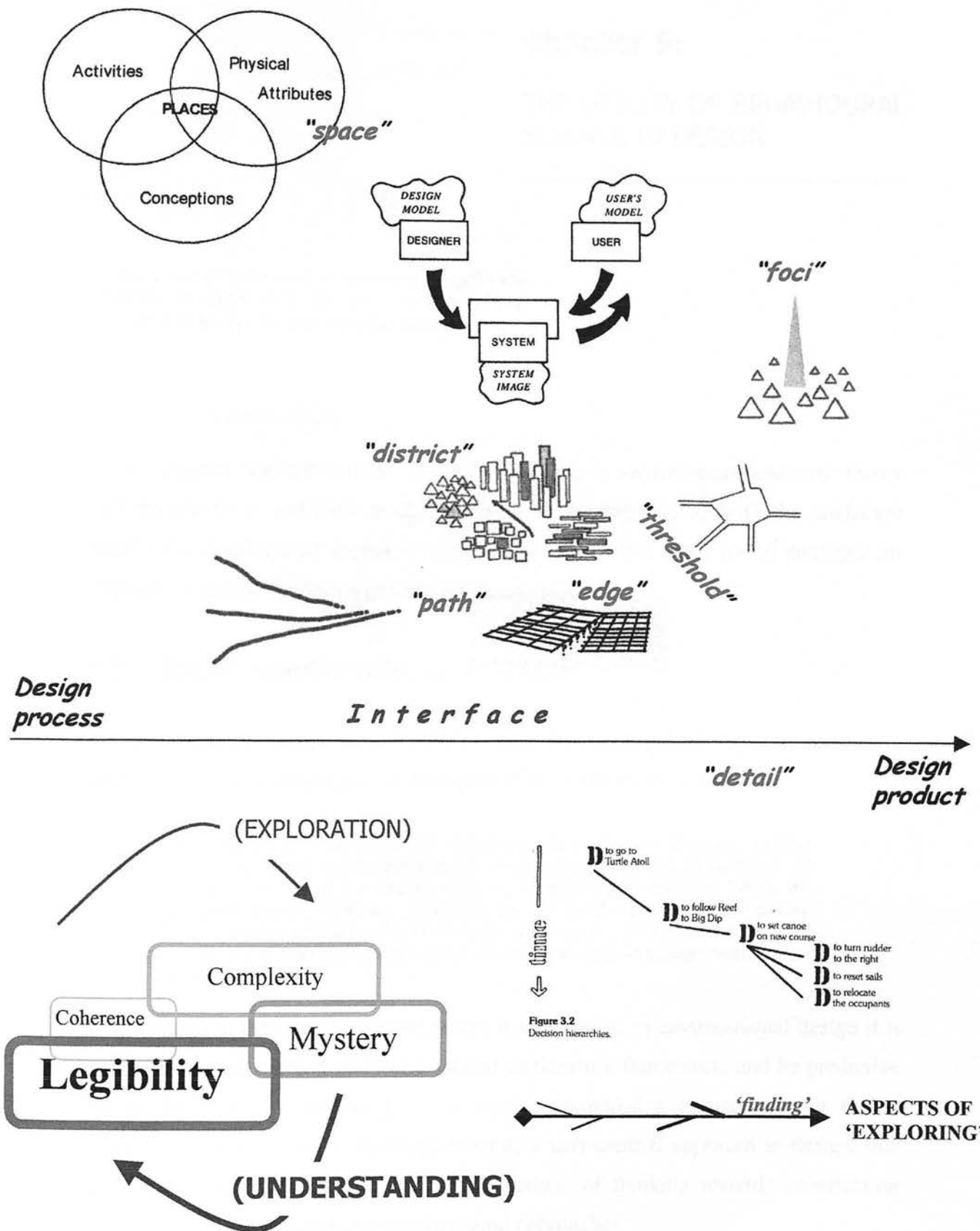


Plate 4.3 – A ‘thinking machine’ for an experiential approach to landscape design *with the user in mind*. The top half of the page illustrates core facilitating theories (‘static’ models), whilst the bottom half illustrates some tools and techniques for analysing the landscape experience with aspects of exploring in mind (‘dynamic’ models).

Chapter 5:

THE UTILITY OF BEHAVIOURAL SCIENCE IN DESIGN

"...the future of landscape as a culturally significant practice is dependent on the capacity of its inventors to image the world in new ways..."¹

5.1 INTRODUCTION

In this chapter, the behavioural concepts embodied in environment-behaviour theory will be identified and their design relevance, and compatibility with the landscape architect's visual-spatial approach critically reviewed. The most useful concepts for application during the design process will be highlighted.

5.2 SOCIAL RESPONSIVENESS IN DESIGN

It was established at the outset of this thesis that the applicability gap presents a problem relating to the generation and application of theory for design:

"...the sources of knowledge for designers are normative theories, design paradigms or 'style' and personal experiences, all of which are considered not to be 'scientific' since the explicit reliance on established theories based on empirical findings is minimal....designers are still being criticized for the quality of their solutions and lack of sensitivity to user needs. Therefore the issue of generating and integrating socio-behavioural knowledge in design needs to be resolved."²

It was found in the last chapter that theory is most *useful* to environmental design if it can provide both a broad philosophical and explanatory framework, and be predictive 'in action'. Whilst the two previous chapters provided a groundwork for theory building in the experiential paradigm towards a user-centred approach to design, this chapter will focus on setting out the foundations of thinking towards constructing bridges for integrating spatial and behavioural approaches.

¹ CORNER, James, (Ed), *Recovering Landscape. Essays in Contemporary Landscape Architecture*. Princeton Architectural Press, USA, 1999, p 167

² SANCAR, Fahriye Hazer, "Behavioural knowledge integration in the design studio: an experimental evaluation of three strategies", *Design Studies*, Vol 17, Issue 2, April 1996, p 135

Firstly, the chapter explores the two aspects of the gap problem which state that on the one hand behavioural knowledge is lacking in design relevancy and on the other hand [landscape] designs are lacking in social responsiveness.

The problem

The general lack of social responsiveness in design has been described by environmental design researchers as, at best, ‘frustrating’^{3, 4}, and at worst ‘a major crisis’^{5, 6}. However, socio-behavioural knowledge which is generated *by* researchers *for* designers appears to be lacking in design relevancy.

It was suggested in the preceding chapter, that the consequences of an over-reliance on guesswork affects the designer’s ability to build an accurate ‘system image’ of place. Given that spatial analysis is the landscape architect’s central ‘thinking’ and ‘doing’ tool, this chapter seeks to identify ways in which the design process may be infused with behavioural theory ‘in action’. The suggestion is that by improving the landscape architect’s ability to integrate ‘user’ considerations into the same thinking process that structures the designer’s own response to place but through a different ‘lens’, could help towards explaining and describing a reasonably accurate ‘system image’ of place and yet not compromise the creative act of design.

Although the conceptual place-making structure produced at the end of the preceding chapter (**plate 4.3**) is intended for application interchangeably in urban or non-urban landscapes, the current chapter begins its theoretical exploration in the urban landscape since this is the context within which much of the social theory for landscape design first took shape.

Socio-behavioural theoretical development

In the early 1960s Jane Jacobs described cities as being immense laboratories for trial and error, and failure and success, in building and design.⁷ This is the laboratory in

³ op cit, SANCAR, Fahriye Hazer, 1996

⁴ EDRA 32/2001, Proceedings of the 32nd Annual Conference of the Environmental Design Research Association, 3-6 July 2001 in Edinburgh, Scotland, EDRA, Oklahoma, 2001

⁵ CAIRNS, George, M, “User input to design: confirming the ‘user-needs gap’ model”, *Environments by DESIGN*, vol 1, number 2, November 1996, pp 125-140

⁶ SANCAR, Dr F H, and Studer, Dr R G, “How knowledge is produced for design”, *Environments by DESIGN*, vol 2, number 1, Winter 1997/1998, pp 29-54

⁷ JACOBS, Jane, *The Death and Life of Great American Cities*, Cape, London, 1962

which researchers believe designers should have been learning but instead practitioners were, and continue to be, criticised for ignoring the lessons and remaining incurious about the reasons for unexpected success, and remaining guided instead by principles derived from appearances.⁸

Jacobs' book 'The Death and Life of Great American Cities' was published in the same year (1961) as both Lynch's 'Image of the City' and Cullen's 'Concise Townscape'. It is notable that the research approaches adopted by both Lynch and Jacobs lacked the graphical approach that enabled Cullen to carry out his critical reflections on the urban environment but both conducted a type of visual analysis with an experiential perspective. However, as identified earlier, the problem with the Cullenesque approach is that it encourages a highly subjective approach. Even though Cullen did introduce an experiential perspective to design, it became lost "in a largely cosmetic activity of townscape enhancement and facelifting"⁹ and the 'people-centredness' of his original perspective was, according to Punter, largely obliterated by the art of visual composition. In addition Punter highlights the detrimental role of urban conservation in reinforcing the superficial aspects of design which focus on visual appearance, when it became a driving force for design guidance during the late 1960s.

The townscape tradition later became broadened out of a renewed interest in the social dimension of environmental design/urban design and publications such as 'Responsive Environments' by Bentley et al (1985) emerged. The approach suggests that in order to ensure there is a good 'response' in environmental design, the designer should ensure the environment 'fits' the user needs. For this seven qualities that make a built environment 'responsive' were identified. These were permeability, variety, legibility, robustness, visual appropriateness, richness and personalization. But despite such attempts to integrate social considerations into the design process, visual design ideals have had a lasting impact to the detriment of the social and physical environment.¹⁰

Alice Coleman and others concerned with reconciling the social and visual perspectives of environmental design, develop theories and findings about city environments based on how they actually work in real life, rather than exploring predetermined ideas and

⁸ HOUGH, M, Out of Place. Yale University Press, New Haven and London, 1990

⁹ PUNTER, John, "Urban Design Theory in Planning Practice: The British Perspective", Built Environment, vol 22, no 4, 1996, p 267

¹⁰ op cit, HOUGH, M, 1990

theories about how they should work. Hillier's work is of particular importance, for its use of spatial analysis.

The use of spatial analysis in environment-behaviour studies

The field of environment-behaviour studies has been strong in describing and analysing behaviour, but has been large ineffectual when conceiving of behaviour in the physical setting context.¹¹ However, space syntax is an exception: this conducts behavioural analysis in an approach that conceives of social space *in the context* of its spatial system. Space Syntax is a method developed by Hillier to analyse the configuration of space itself. He identified that good spatial connectivity – both physical and visual – enables ease of human transition through the system. An example of the application of space syntax to real world design is illustrated below in figure 5.2.i which illustrates its use in the redesign of Trafalgar Square in London.

The space syntax map shown in figure 5.2.i (b) shows Trafalgar Square in the centre of the map where green lines are seen intersecting. The green lines indicate that the square is not well integrated with the surrounding street structure – green being representative of routes that are not well integrated with the spatial system. Diagram 5.2.i (c) shows a behaviour map of detailed observations made to complement the space syntax maps. This indicates two separate patterns of use, that is, a segregation of use *and user type*, between 'visitors' (plotted in red) and 'Londoners' (plotted as blue lines). 'Visitors' were seen spending time doing stationary activities as compared with 'Londoners' who were seen to be predominantly on the move passing around the space, but generally not through it.

Space syntax was an important introduction to environment-behaviour research for linking spatial and behavioural approaches. Spatial analysis is about techniques that describe environments and when such descriptions are related to specific problems of human behaviour, this is when it is most useful. According to Teklenburg and Heitor¹², spatial analysis is in theory integrated with environment-behaviour studies in any case, but the problem is, few practitioners are engaged in spatial analysis research, and even

¹¹ TEKLENBURG, Jan A F, HEITOR, Teresa V, "Spatial analysis in environment-behaviour studies: Topics and trends", presented at the meeting of the Spatial Analysis Network at the IAPS 14 conference 'Evolving Environmental Ideals, Changing Ways of Life, Values and Design Practices, Stockholm, 30 Jul-3 August, 1996 [<http://www.bwk.tue.nl/urb/p/Jan/Spatial.htm>]

¹² *ibid*

less so in the context of environment-behaviour research which, as a consequence remains largely a scholarly topic.

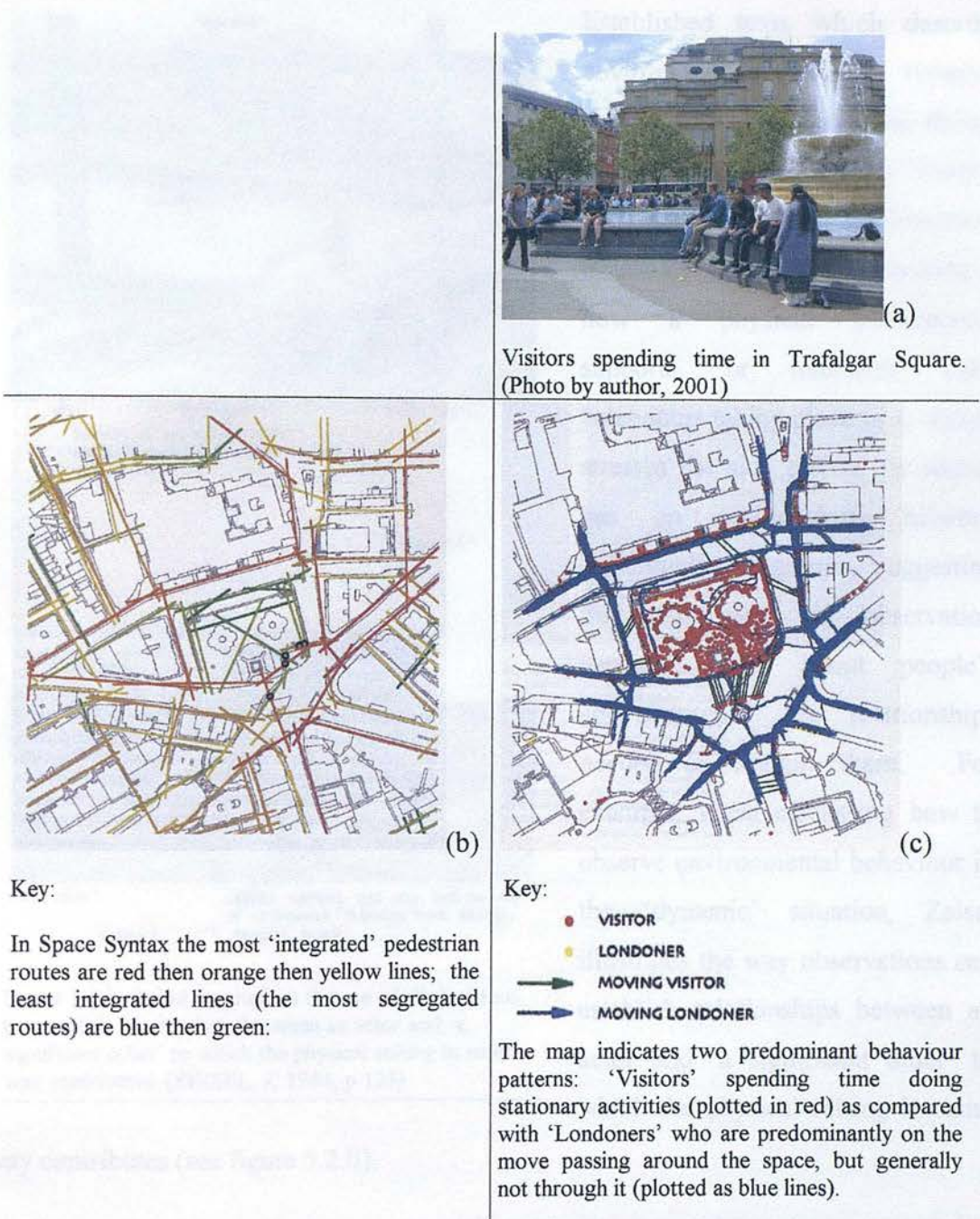


Figure 5.2.i : The use of Space Syntax in design: Trafalgar Square project, London: (STONOR, Tim, 1998, p 97)

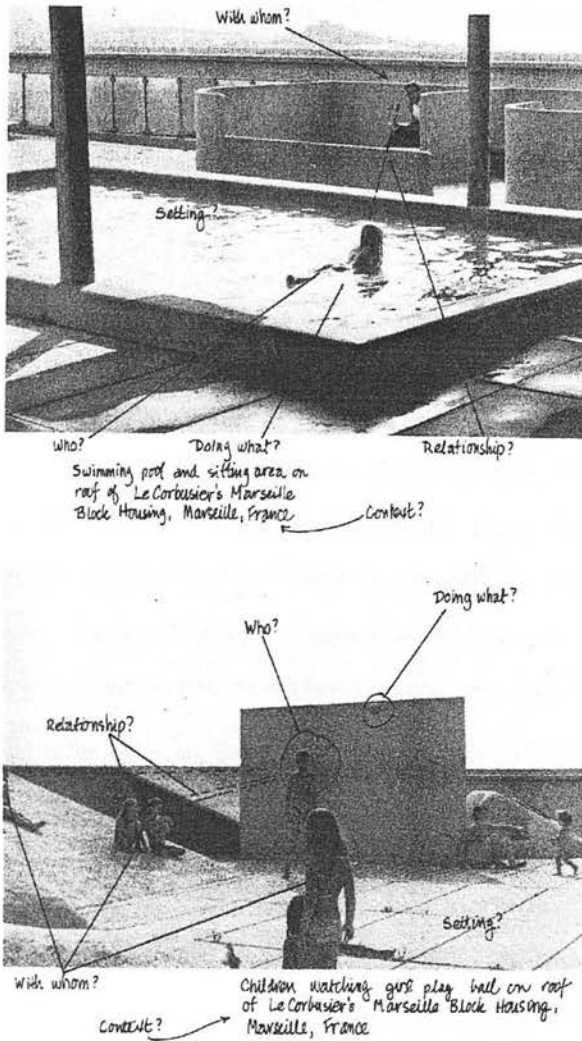


Figure 5.2.ii: Zeisel emphasises the use of observations to establish relationships between an actor and 'a significant other' to which the physical setting in some way contributes. (ZEISEL, J, 1984, p 125)

Established texts which describe environment-behaviour research methods for environmental design purposes, such as Zeisel's 'Inquiry by Design'¹³, describe environment-behaviour observation as looking at how a physical environment supports, or interferes with, behaviours taking place in it. Zeisel stresses the side effects the setting has on relationships between individuals or groups, suggesting that this type of observation generates data about people's activities and the relationships needed to sustain them. For example, when discussing how to observe environmental behaviour in the 'dynamic' situation, Zeisel illustrates the way observations can establish relationships between an actor and 'a significant other' to which the physical setting in some

way contributes (see figure 5.2.ii).

In the previous chapter it was noted that environment-behaviour theory has its roots in the transactionalist approach. This is a conceptualisation of the human-occupied environment as a two-way relationship in which there is a cause-and-effect transfer between individual and environment. In this approach, the 'environment' is conceived of in 'ecological' terms. This is also the foundation of thinking behind the product design approach as described by Norman. However, Zeisel's given illustration of the

¹³ ZEISEL, John, *Inquiry by Design. Tools for Environment-Behavior Research*. Wadsworth, Cambridge University Press, 1984, UK, USA, Australia.

use of environment-behaviour observations does not align exactly with Norman's ergonomics/product design approach: whereas the latter approach emphasises the interactivity between user and environment in terms of whether or not the environment-setting is *working* as a *design product*, Zeisel's example appears to emphasise whether or not the space works as a *social* setting, and although the two are inter-linked, the intent is different. Either way, however, the objective is to take the guesswork out of design.

Taking the guesswork out of design

The problem with relying on intuition in design is that it may or may not be error free. In the informal situations of everyday life, errors are not too serious because we are usually able to recognise and rectify them before disasters occur. But in the case of design intervention in public space settings, mistakes can go unrecognised until it is too late. The problem is described in decision theory as a limitation of the brain in making mental models that can assess a probable outcome accurately.¹⁴ Apparently, humans are not designed by evolution to evaluate probabilities carefully because there was no pressing need to so, and as long as we get it right most of the time, this is good enough.

Getting it right most of the time seems to involve learning a few rules of thumb.¹⁵ In the context of the design process these become built into the mental models that our brain uses to help us deal with incoming information and its processing, as developed through our learning process using design theory. As suggested earlier, key theories embodied in the discipline, such as Lynch's model, explain and influence our information gathering process. According to Zeisel¹⁶, design information must be organised, processed and externalised, in a predominantly visual way, in a complex process which inventively mixes together ideas, drawings, information and so on, to create something 'where nothing was before'. Zeisel describes imaging as a key activity entailing the ability to 'go beyond the information given'.¹⁷ In design, imaging means forming a general, sometimes only 'fuzzy', mental picture of a part of the world. This picture provides designers with a large framework within which to fit specific pieces of a problem as they become resolved:

¹⁴ DUNBAR, Robin, *The Trouble with Science*. Faber and Faber Limited, London, 1995

¹⁵ *ibid*

¹⁶ *op cit*, ZEISEL, John, 1984

¹⁷ BRUNER, 1973, paraphrased in: *ibid*

"Designers can use their visions of eventual solutions to define better the design problem they are working and to guide their search for answers. Comparing a design against a mental image makes visible where the design can be improved and perhaps where the image itself might be modified."¹⁸

The place-making model presented at the end of the last chapter (**plate 4.3**) is intended to provide a basic framework structure to help the designer represent the 'system image' as an aspect of the visualisation process that takes place when 'imaging'. The challenge remains for this research study, in developing this further for 'evaluation and execution' purposes.

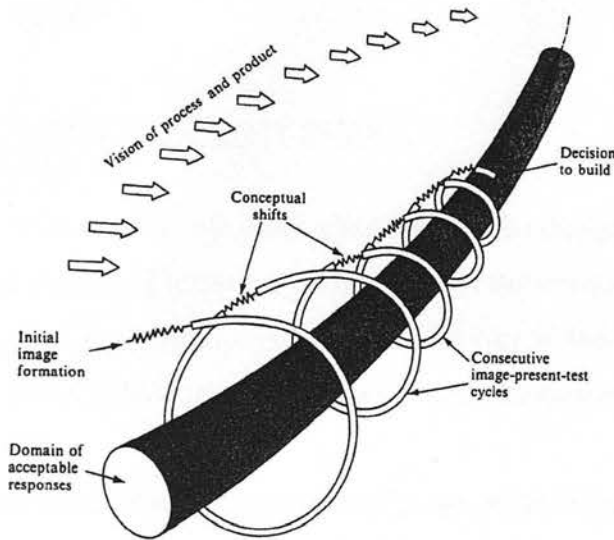


Figure 5.2.iii: Design development through linked cycles: a spiral metaphor. (ZEISEL, J, 1984, p 14)

According to Norman evaluation is 'comparing what happened with what we wanted to happen', whilst execution is 'what we do to the world'. This is of course difficult in the context of landscape architecture where we cannot 'test' (evaluate) the design until it is already built (executed). However, the theory implies that individual aspects of the

proposed design could be tested and re-tested in an ongoing cyclical process as part of the 'natural' process by which design takes place - as illustrated by Zeisel - in his spiral metaphor (figure 5.2.iii). The question of 'how' is at the centre of discussion in this thesis.

Zeisel's spiral metaphor reflects the following characteristics of design¹⁹:

- 1) designers seem to backtrack at certain times – to move away from, rather than toward, the goal of increasing problem resolution;
- 2) designers repeat a series of activities again and again, resolving new problems with each repetition; and

¹⁸ FOZ, 1972 paraphrased in: op cit, ZEISEL, John, 1984, p7

¹⁹ ibid, p 14

- 3) these apparently multidirectional movements together result in one movement directed toward a single action.

Zeisel suggests that backtracking is the ‘testing’ process by which we constantly return to problems already studied to revise or adjust earlier decision making. Not only is the process unavoidable, it is essential to improve design quality. It is a feedback loop in which designs are tested and re-tested towards attaining a ‘vision for process and product’. It is here that user needs evaluation should be incorporated into design and where spatial/behavioural compatibility issues must be overcome. The key issues will now be discussed.

5.3 COMPATIBILITY ISSUES

The visual-spatial approach characterises the design process in landscape architecture. Since the use of form-images is central to the development and organisation of ideas for design, it is appropriate to consider the gap problem itself in terms of an image. The DNA double helix model provides a useful metaphor in this respect.

A metaphor for the behavioural science/landscape design gap

The DNA double helix is used to represent the two strands of the thinking in research and design which spiral around each other (this constitutes ‘the problem’). The ‘base pairs’ bridging the two strands can be considered ‘the solution’: these represent theoretical concepts and practical tools and techniques which are spatially/behaviourally compatible. In this way, the image is useful for articulating both the existence of the gap problem, and the potential means of overcoming it.

What is so useful about this imagery in its own context (molecular science) is that it allows the layman to conceptualise a phenomenon that would otherwise remain incommunicable outside the sphere of science. Dunbar suggests that the metaphorical approach opens up new paradigms and productive avenues of research by

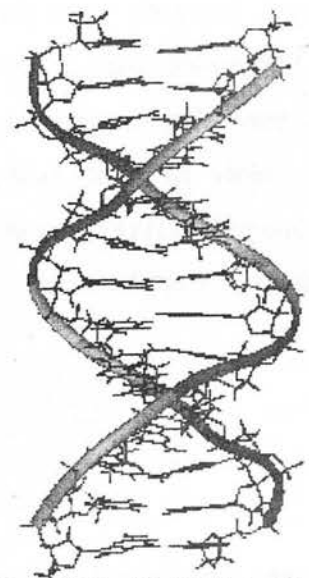


Figure 5.3.i: The DNA double helix: a metaphor for the research/design gap problem. (Image source unknown)

which complex knowledge can be translated into a usable form:

"The world has turned out to be even more complex than we had thought, yet the principles that underlie this complexity have proved to be elegantly simple."²⁰

Generating theory for design

As emphasised by Lang and Meyer, the positivist approach is particularly suited to generating theory for environmental design use. In addition, Meyer emphasises that theory generation for landscape architecture should be 'situated' because:

"Landscape theory is specific, not general... it is explicitly historical, contingent, pragmatic and ad hoc. It is not about idealist absolute universals. It finds meaning, form, and structure in the site as given."²¹

As a critical theorist Meyer emphasises the need for external linkages with other 'cultural' ideas, whilst at the same time strengthening the position of landscape architecture, and in addition she adopts an historical perspective, whilst offering new directions. The current thesis follows Meyer's general critical approach - highlighting the evolution of the current position whilst at the same time offering new directions – but at the same it provides an *interpretation* of the applicability gap problem.

The critical/interpretive approach broadly summarises James Corner's thinking which also emphasises the situatedness of landscape architecture, as "something based on situated experience, placed both within space and time as well as in tradition..."²². Corner suggests that towards finding a new way of thinking about the landscape, innovations do not necessarily have to be radical and completely new: "they may derive equally from a subtle realignment of the codes and conventions of some convention or technique."²³. This thesis proposes that the theories, concepts, tools and techniques for analysing and describing the landscape from an experiential point of view, are embedded in environment-behaviour theory but they need to be re-interpreted for use in landscape architecture. Thus, the theory exists (it is 'there') but needs to be brought into perception for use 'here' in landscape architecture.

²⁰ op cit, DUNBAR, Robin, 1995, p 142

²¹ MEYER, Elizabeth in: SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader*. University of Pennsylvania Press, USA, 20002, p 2

²² CORNER, J, 1991, in: EATON, Marcella, "Philosophy and Design in Landscape Architecture", PhD thesis, Edinburgh College of Art, Heriot Watt University, July 1997

²³ CORNER, James, (Ed), *Recovering Landscape. Essays in Contemporary Landscape Architecture*. Princeton Architectural Press, USA, 1999, p 164

Existing theory

There are certain key concepts and theories from the behavioural sciences that were identified by the pioneering designer-researchers from the 1960s/70s for their potential compatibility with, and usefulness to, design. These researchers made progress in 'translating' these into a useful form for design, but since their application in mainstream design has remained limited, this indicates that there remains a compatibility problem.

Constance Perin's publication 'With Man in Mind' is identified by this thesis as providing a grounding text and a key departure point for theory building towards a user centred approach to landscape design. Perin made a significant (arguably the first) step in highlighting the relevance of theories developed within the behavioural sciences to the environmental design disciplines. She initially identified a problem of translation which she termed the designer's 'blunt pencil'²⁴.

The designer's blunt pencil

Perin highlighted the limitations of the theory in environmental design as an inadequacy on the designer's part to match what she termed 'a pattern of form' with 'a pattern of use'. She asked 'what do we need to know in order to design with man in mind?', she identified the need to find unifying concepts which can introduce 'substance' into the creative act and recognised that the designer would not and could not adopt 'the social survey' approach since the designer's role is in designing physical things.

The problem as Perin saw it, is that through lack of appropriate theory, designers generalise expectations of what people want. She states that we (as designers) enact behaviour according to our own schemata and consequently fail to generate understanding from others' perspectives. The problem is that 'the individual' is not a suitable model for a designer to integrate user needs in their design process. There is a difficulty in trying to reconcile the subjective response to place, and yet also take into account a perspective of place that encompasses a collective view from all the different users. With so many potentially different user perspectives, and given the orientation of design theory towards the subjective response to place, it is difficult for the designer to know if her/his design response is adequate.

The problem of 'generalisation' of user needs, according to Perin, is related to the words designers use to describe people's needs. According to Perin, even if users are asked directly through social research enquiry, the same generalisation of 'needs' occurs. She gives the example of the said need to be 'comfortable': this does not actually tell the designer how to respond and the designer must translate words into forms. The problem, according to Perin, is that to be 'comfortable' is lacking in 3-dimensional form and is therefore too vague a concept for design. Similarly, Lynch's five measures for good 'city form' - vitality, sense, fit, access and control – and although oriented towards design, are also highly generalised terms open to interpretation.

Generalising user needs

Environment-behaviour research has produced numerous measures of 'good' design. Whyte was a pioneer researcher looking at how people use public spaces, working intensively to learn how to make the best possible use of public space in New York. As a social scientist he was focused on studying the use of the environment and 'measuring' it for its anthropometric qualities, for example, the ideal width of a ledge for sitting. He also developed techniques for studying in detail how people interact with streets, parks, and plazas. He effectively measured quality of life in the outdoor public place in New York, and as a consequence has been termed by one of his former students Paco Underhill 'as a scientist of the street – one of the first'.²⁵ Underhill highlights how extraordinary this is, in considering how long streets existed before Whyte came along.

After completing much research on public plazas, Whyte concluded that had he had the prescience of mind, he would have studied the street alone since all the basic elements of a successful urban place are to be found here. By studying the street, Whyte discovered certain common denominators that created a successfully used urban place. These factors may be summarised as the following categories of need:

- provision of choice and control over sitting space;
- provision of choice and control over entering a space, passing through it and leaving it;
- availability of food;
- comfortable micro-climate provided by sun, wind, trees and water
- the presence of other people; and
- and 'something going on'.

²⁴ PERIN, Constance, *With Man in Mind. An interdisciplinary Prospectus for Environmental Design*. The MIT Press, USA, 1970.

²⁵ UNDERHILL, Paco, *Why we buy. The science of shopping*. Touchstone, New York, 1999

Whyte made the point that places that ‘work’, or function, well are often more a result of inadvertency than design, and that such places point us to environmental ‘quality’. This is because people ‘choose’ to use these places, and as such these may be considered ‘social indicators’ that lead us to identify problems as well as potentials. In his studies of bus-stops Whyte concluded that a ‘good’ bus-stop as one that had the qualities of a good public space or park but in microcosm scale. He proposed that all bus-stops should be designed as ‘parklets’. Christopher Alexander too, in his pattern no 92 (figure 5.3.ii) suggested that bus stops should be built “so that they form tiny centers of public life. Build them as part of the gateways into neighbourhoods, work communities, parts of town. Locate them so that they work together and with several other activities, at least a news-stand, maps, outdoor shelter, seats, and in various combinations, corner groceries, smoke shops, coffee bar, tree places, special road crossings...”²⁶.

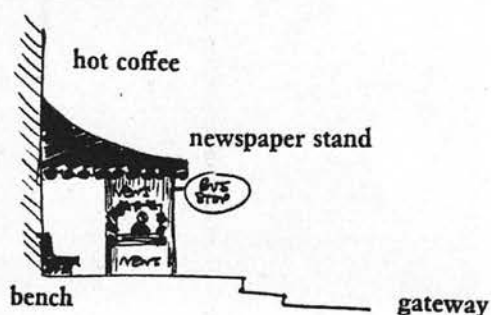


Figure 5.3.ii: Pattern no 92 ‘Bus stop’
(ALEXANDER, Christopher, 1977, p 453)

Plate 5.3 (see page 167) shows an example of a quality bus-stop created through ‘inadvertency and choice’ –(bus stop ‘A’). Here the edge of a cemetery provided a low, wide wall at sitting height that was seen used by people waiting for a bus in Aberdeen’s main street. It is a sunny spot (important in a cold climate) it also happens to be by a gateway to the cemetery, the wall provides a long ‘seat’, or simply a ‘shelf’ for resting or sorting out shopping bags. Also, by sitting here for the purpose of waiting for a bus, the user is able to get a good view of the bus approaching. Based on observations made at a variety of bus-stops in Edinburgh and Aberdeen, this appeared to be a highly critical, but often neglected human comfort need, overridden by the need for ‘shelter’.

In the everyday bus-stop waiting situation people display overt behavioural indications of the need to see the bus approaching. Also, based on personal experience, it is very stressful if your view is blocked, even when it is not crowded, particularly if you have bags and a child because one needs to read the bus number, have time to react, move out and signal the bus to stop, and/or get past other people, gather your belongings together – whether shopping bags, or a child and buggy – in order to avoid missing the bus

altogether. This is a basic need to maintain a sense of control over one's situation. As illustrated in figure 5.3.iii below and **plate 5.3** overleaf, the expensive new bus-stops for Edinburgh's Princes Street limit the users' choice over where to stand, and thus restrict lines of visibility. Although this is not a particular problem when quiet, during busy times, the pavement soon starts to congest.

Bus-stop example 'B' shown in **plate 5.3** overleaf is intended to illustrate the lack of design performance of this bus-stop as 'rush hour' begins. Although the bus-stop provides extra large shelter for people to stand in, because of the loss of visibility in the view ahead, users will bunch up at the road edge of the bus stop so that they can see ahead through the 'window' of the bus-stop, or stand outside the bus-stop in front of it, or in the middle of the pavement thus adding to pavement congestion. Only when crowded or raining do users really make use of the space behind the advertising boarding – but only because they are forced to.



Figure 5.3.iii: commercial interests being put before human comfort needs in Edinburgh's new bus-stops in its main street (Princes Street – bus-stop example 'B').

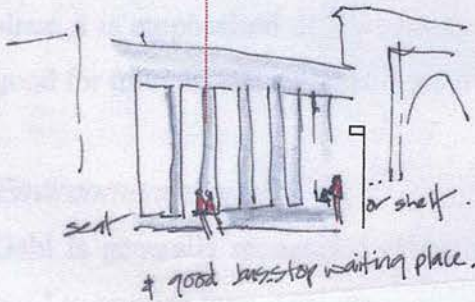
The new bus-stop design – which in this instance places the siting of advertising boarding as more important than people's everyday needs – is also counter productive to the general planning strategy for the street, which is to address pedestrian congestion.

²⁶ ALEXANDER, Christopher, *A Pattern Language: towns, buildings, construction*, Oxford University, 1977, p 453

Bus stop A



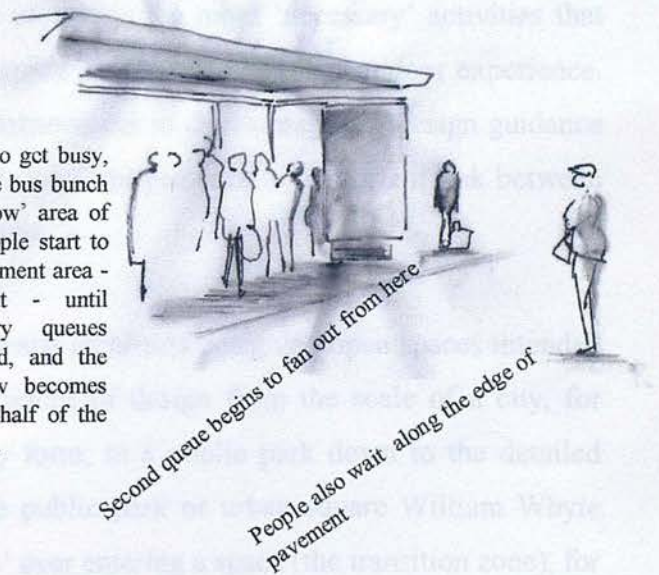
inadvertency & choice



Bus stop B



As the street begins to get busy, people waiting for the bus bunch up behind the 'window' area of the shelter; then people start to stand around the pavement area - firstly dotted about - until eventually secondary queues form where indicated, and the main pedestrian flow becomes impeded; meanwhile half of the shelter remains empty.



Newspapers,
sandwich shop,
coffee available
here.

Plate no 5.3 – analysing the design performance of a bus-stop waiting area.

In their study of Edinburgh in 1998²⁷, Gehl Architects state that the present patterns of pedestrian movements in the city serve as ‘a necessary point of departure’ for discussion towards identifying proposals for this part of the city. The report states that, based on current usage, Princes Street is the ‘undisputed main street’ and yet the place with ‘most problems’. Highlighting the fact that compared with other cities of similar sizes, the pedestrian counts are actually ‘surprisingly low’, Gehl Architects suggest that the street’s problems are less to do with numbers of pedestrians, but rather to do with the environmental quality of the street.

On the issue of street quality, aside from the pragmatic issues related to everyday usage, in their report Gehl Architects emphasise the importance of the ‘message’ of the street in a wider context of thinking, which, they state, should clearly signal ‘you are welcome in our city’. This links street quality with the commercial interests of the city, namely tourism. This is a fundamental point in terms of planning for environmental quality since it is emphasised in key writings on strategies for tourism that what makes a city good for tourists, is a city that is good for the people who live there^{28, 29}.

Environmental quality

Gehl is generally recognised in the design world for his philosophy which states the need to provide for a wide range of ‘optional’ activities for human use in order to ensure that ‘social’ interaction may take place alongside the more ‘necessary’ activities that humans have to carry out in the public space setting, for a quality outdoor experience. As with Whyte’s research, which was instrumental in developing new design guidance for public space provision in New York, Jan Gehl provides an important link between environment-behaviour research and design.

The quality measures provided for landscape architects designing open spaces intended for human use have application at all scales of design from the scale of a city, for example Lynch’s measures of good city form, to a public park down to the detailed design of a bench. At the scale of the public park or urban square William Whyte identified the need for ‘a sense of choice’ over entering a space (the transition zone), for seating options such as moveable seats, and so on.

²⁷ GEHL Architects, “Public Spaces – Public Life. Edinburgh 1998. First impressions concerning Potentials and Problems”, 1998

²⁸ ASHWORTH, G J and TUNBRIDGE, J E, The Tourist-Historic City. Belhaven Press, London, 1990

Most of the 'measures' identified in environmental design-related research reinforce each other. For example Frances Tibbalds refers to the maxim 'to seed a place with activity, put out food,'³⁰ and Jan Gehl's mantra 'nobody goes where nobody goes', warns designers of the pitfalls of poor quality design. In addition there are other practical measures such as ensuring there is appropriate disabled access, steps of a comfortable and usable riser/tread ratio, shelter from the sun, rain, wind and so on and finally there are the pragmatic detailed dimensions recommended, for example ramp gradients, seat heights and so on, which are all intended to provide measures for overall environmental quality in the design of open spaces. Designers are thus provided with, and expected to make provision for, a multitude of social and practical considerations in their design response. The problem, ultimately, is that there is a tendency towards the slogan response to design, where conjectural claims preside.

Defining 'environmental quality'

Determining the meaning of environmental quality is problematic. Environmental quality cannot be determined by aesthetics alone but nor can it be determined by the extent to which an open space fulfils user needs for 'recreation', for example. In fact, environment quality as such is unmeasurable. However, human usage of space can be measured in terms of numbers of people using a space, for example. As highlighted by Gehl, environmental quality can also be 'measured' in terms of whether or not people spend time in a place.

Cullen's view, not unlike Gehl, emphasises that quality is concerned with the detailed design of places which create a sense of place and so inspire pedestrians to spend time. Cullen cites a number of spatial qualities ranging from the abstract to the specific, which he groups into 'Place' and 'Content' qualities. This type of categorisation is highly significant to landscape analysis since it enables the designer to distinguish between the background, spatial form of the landscape (its configurational qualities) and its detailed design: this is the foundation of thinking behind the spatial sequence technique which utilises the concept of the 'optical split'.

In Cullen's category of *Place* he includes qualities such as 'hereness' and 'thereness', 'linking and joining', and the concept of 'possession' (including 'focal point',

²⁹ ORBAŞLI, Aylin, *Tourists in Historic Towns. Urban conservation and heritage management*, E&F N Spon, London, 2000

'precincts' 'advantage' and 'mystery'); in terms of *Content*, Cullen includes qualities of 'thisness and thatness' which exist in the overall spatial framework of place. For this he provides concepts such as 'juxtaposition', 'metaphor' and 'intricacy', and other more specific concepts such as 'trees incorporated'. However, this thesis suggests that the approach would benefit from an infusion of behavioural science concepts.

In the sphere of environmental psychology Rapoport³¹ classifies environmental quality into two interpretations: firstly he identifies a category termed 'physical-chemical-ecological', and secondly 'psycho-socio-cultural' qualities. The first category refers to the physical environment such as air, water, noise and visual quality, and the second category refers to the more complex psychological and socio-cultural qualities. However, to categorise 'quality' for landscape design purposes in this way is not particularly useful since in this discipline 'culture' is inseparable from the physical attributes of place. For example, the extent to which crowding affects environmental quality, and thus the extent to which a design should account for this, is affected by what is perceived as 'crowding' in a given culture.

This thesis has already identified that 'culture' has a mediating role between aesthetics, behaviour and perception. However, to use 'culture' as an indicator of quality in the landscape setting, is impractical, if not impossible, given that 'culture' is characterised by uniqueness (of people and place). This follows through to the designer him/herself since perception of what the user needs are (or are not) can occur in an unconscious way through a designer's own cultural conditioning.

Basic user needs can coincide with the designer's own needs and preferences where there is a shared cultural background. User needs can become embodied in the design process: for example, where a designer is living in and designing for people in a hot climate, the use of tree planting to provide shelter from the sun along walkways and sitting areas and so on, takes on a particular 'meaning'. Through the use of indigenous tree species, for example palm trees lining a main street in a town in southern Spain, a particular style becomes embodied within the 'character' of place. Here, the embodiment of user needs in the design process occurs unconsciously because it is an

³⁰ TIBBALDS, Francis. *Making People-Friendly Towns. Improving the Public Environment in Towns and Cities*. Longman, England, 1992

³¹ RAPOPORT, Amos, 1982, quoted in ABOU EL-ELA, Manal, "The Landscape Context of Planning for Recreation. The psycho-physiological approach to the design of open spaces", PhD thesis, Landscape Architecture, Edinburgh College of Art, Heriot Watt University, 1996

habitual approach. This thesis argues that the same 'habits' of design could be adopted to embody the full range of user needs issues but this would require a designer to become conscious of his/her design thinking in order to be able to embody a new way of thinking and that this is difficult to achieve given the deeply embedded ideals that are entrenched in design thinking. However, when learning, if designers are taught from the outset to embody user needs considerations through integrated spatial/behavioural observation, and for critical analysis of existing landscapes, in theory, landscape architects could adopt different, and more effective, habits of design. In general terms, the deliberate and conscious use of behavioural observation for identifying user needs issues and evaluating performance, is generally the imperative of researchers rather than designers.

Defining user needs

When Broadbent explored the question of 'what are the basic human needs required for comfort?', he compiled a list of necessities without which a person will die, including breathing, eating, drinking, sleeping and so on.³² When he realised that, given a reasonable climate a person can achieve all these things without the need for a building, he came to the conclusion that a building plays a disappointingly small role in the satisfaction of man's basic needs. Rather, he suggests that the reason to build should be to provide sensory *stimulation*. If this is so, and environmental quality is much more than the satisfaction of basic human needs, the difficulty for designers is to know which user needs are relevant to what design response in the first instance. Thus, there is a question of how to *know how* to reconcile visual aesthetics with the social needs of design. The difficulty in formulating an adequate design response is compounded by the deterministic approach to design which remains deeply embedded in design thinking.

New urban design guidance that has appeared in Britain since the emergence of the Urban Task Force, led by Lord Rogers, is attempting to close the gaps in understanding that create the professional 'estrangement' from everyday living. Ultimately, the gap problem is related to the fact that design begins with an intention in the mind. But as stated by Jarvis, "too often that intention was formed in professional minds from

³² BROADBENT, G, *Design in Architecture: Architecture and the Human Sciences*, John Wiley and Sons, London, 1973

information that was far from perfect in portraying the normal human condition.”³³ And thus the new guidance has emerged in recognition of the need for new ways of thinking.

Towards a new way of thinking

The British Urban Design Group’s initial response to the British Government’s Green paper³⁴ had set out a series of views on what the new guidance should achieve. In their response, some fundamental questions were raised as to how design professionals might get a view of what is the ‘normal’ experience of places and how to get [urban design] back to the “messy indeterminate four dimensional inhabited continuum that is real life in real places.”³⁵

The Government’s lists of objectives produced in new planning guidance documents are intended to encourage writers of policy and decision makers influencing urban design guidance to ask a series of questions ‘that go deeper than generalisations’ that have appeared so far to fail to capture the ‘normal’ experience of place:

“These questions should draw together urban design objectives and aspects of development form. For example, what form of layout would help to achieve a particular objective in this context? What scale? And so on, depending on what is considered relevant. Guidance based on such systematic thinking will help developers and designers by moving beyond simple exhortations that, for example, new development should be ‘in character’.”³⁶

To this effect the list of objectives for good urban design is presented as ‘prompts to thinking’. This comprises: Character - A place with its own identity; Continuity and enclosure - A place where public and private spaces are clearly distinguished; Quality of the public realm - A place with attractive and successful outdoor areas; Ease of movement - A place that is easy to get to and move through; Legibility - A place that has a clear image and is easy to understand; Adaptability - A place that can change easily; and Diversity - A place with variety and choice. The policy guidance acknowledges that the objectives by themselves are abstract, and states that they only have impact on people’s lives by being translated into development. In order to tailor the objectives to the locality of a development, the documentation emphasizes eight

³³ JARVIS, Bob^b, “Place and Performance: What’s normal, then? Just being human in the city”, Urban Design Quarterly, Issue 82, Spring 2002, p 17

³⁴ as reported in: Urban Design Quarterly, Issue 82, Spring, 2002

³⁵ op cit, JARVIS, Bob^b, 2002, p 16

³⁶ extract from HM Government Planning documentation: “Urban design in the planning system”, Section 2: Thinking about Urban Design p17, sourced from http://www.odpm.gov.uk/stellent/groups/odpm_control/documents/contentservertemplate/odpm_index.hcst?n=2398&l=2, (2003)

aspects of development 'form': Layout (urban *structure*); Layout (urban *grain*); Landscape; Density and mix; Scale (height); Scale (massing); Appearance (details); and Appearance (materials).

The documentation includes a planning 'toolkit' which emphasises the need to conduct an appraisal - whether the aim is to produce policy, a plan or a brief for a specific site - and provides a set of suggested facilitating techniques. Under the objective 'Quality of the Public Realm – *A place with attractive and successful outdoor areas*' the toolkit suggests that appraisals should be looking at condition, fitness for purpose, contribution to local and civic identity, and at the potential for reducing street clutter. It provides a set of Traffic Measures in Historic Towns produced by the Civic Trust in 1993 and suggests that Public Realm audits should be conducted which include assessments of a long list of factors which includes: hard landscaping, planting, street furniture, structures, banners and signs, lighting, public art and features, shopfronts, advertisements, special treatments and provision (use of colour, tactile paving, wheelchair ramps), safety and security, traffic and highways installations, and finally public space use and management (informal use as well as formal, events, markets, graffiti removal, litter collection and street cleansing).

It is only under the heading 'Ease of movement – *A place that is easy to get to and move through*' that any direct suggestion for the use of environment-behaviour analysis appears to be included. Here it suggests the use of pedestrian counts for assessing pedestrian movement (mentioning 'Fruin Analysis') for assessing levels of comfort on pedestrian routes in relation to crowding, and the use of Space Syntax analysis for examining connections through areas. It is notable that 'Fruin analysis' is a specialist statistical approach, developed as a means of measuring pedestrian traffic capacities. This expresses pedestrian counts as a variable of 'People per Foot per Minute' (PFM), or the number of people passing a given point in one minute divided by the width of the sidewalk.

The new approach to planning guidance for design in Britain is a step in the right direction. However, the available body of literature the policy refers to, and the measures of quality for design provide an array of objectives, lists and statistical and specialist methods. Faced with such an array the landscape designer might ask 'how' to design with the user in mind (and implement such policies). In the very first instance,

one becomes stumped early on when asking 'design what for whom?'. Behavioural science, however, provides the means to overcome this problem.

Identifying 'environmental quality' using environment-behaviour concepts and criteria

Behavioural science provides the means for conceptualising 'the user' as 'the human animal'. This helps reduce the scope of needs into 'basic needs'. General models such as Appleton's 'primitive behaviours' referred to earlier, are particularly useful towards understanding the user's *experience* of landscape to ground a paradigm of thinking about the landscape from an experiential point of view. Maslow's hierarchy of needs which was referred to in the last chapter, provides a general background theory to Appleton's primitive behaviours theory, and provides a basic model of human motivation.

Motivation

Early thinking on motivation ascribed behaviour to instinct alone - that is, the innate patterns of behaviour that are universal in a species.³⁷ However, Maslow's theory helped transition thinking towards current explanations of what drives behaviour, which recognises the role of cognitive factors in the human response.

Fundamental to Maslow's model, and that which grounds contemporary thinking on motivation and needs, is the distinction of humans from lower animals by their advanced learning capacities. This recognises that learning complicates the higher species' everyday living experiences because we are faced with additional demands. These arise when our basic needs such as food and shelter are taken care of and we are able to engage in other leisure, and recreation related pursuits. This has generated a whole new dimension of existence and living brought about by the concept of *choice*.

Choice

Industries centred on consumer studies, such as marketing and advertising, depend on the concept of choice (albeit as an aspect of consumer spending). These areas exploit the psychological tension that arises between needs, wants and desires, and they harness the emotional aspect of 'need'. To do this, these industries refer to *expectancy theory* for understanding human motivation. This explains behaviour as being largely pulled by

expectations of achieving desirable outcomes, rather than pushed from within. This is used to explain why we choose one design ‘product’ over another³⁸. However unlike consumer studies, in the physical world of environmental design, people cannot be manipulated so easily to ‘want’ to use a space if it does not satisfy basic human needs driven from ‘within’, as it were; and on the other hand where users are forced to use a bad quality space because there is no choice, then there is the human ‘cost’ of environmental stress to consider.

In environmental design, our needs/expectations/wants are completely embodied within our general environmental experiences. Although our experience is both physical and emotional, this thesis suggests that the landscape architect, as a designer of physical space, can only effectively employ theories that embody the visible, tangible aspects of user needs. The remainder of the chapter aims to identify *how* a designer might know *what* needs/expectations/wants are important in a particular landscape setting from a visual/spatial perspective.

5.4 PRACTICAL ISSUES

Research findings which provide a list of performance specifications for designers such as ‘accessible’, ‘safe’, ‘a sense of choice’ and so on, when faced with the particulars of a site, do not help the designer know what to do, and specifically, do not help the designer to know *how* to translate user needs/expectations into 3-dimensional forms.³⁹

It was suggested some thirty years ago by Perin that the actual concept of user *needs* is inappropriate to the environmental design disciplines. Firstly, Perin, not unlike theorists in consumer studies, suggested that designers should conceptualise user needs in terms of what users *expect* and then define what people *want*. This is a subtle, but significant shift in thinking:

“If we generalize “expectations” into “what people want” – which might rightly enough be said to be merely another way of stating them – then we run the risk that the designer is faced with the same old blunt pencil unable to put words into forms. What people say they “want” are, more often than not, the utterly non-operational, exhortatory goals that designers would like to fulfil, but how? People “want to be *comfortable*, to work *efficiently*, to feel *satisfaction*, to have a *big enough* office.” The first reason for reducing “what people want” to the

³⁷ SOLOMON, Michael et al, *Consumer Behaviour. A European Perspective*. Prentice Hall Inc, USA, 1999

³⁸ *ibid*

³⁹ *op cit*, PERIN, Constance, 1970

nonverbal, motor behaviours they expect to engage in is, then, part and parcel of the necessity to discuss people in terms having unique meaning for environmental design. Likewise, by not separately collecting quantitative data about attitudes, opinions, values and preferences, but instead by seeing them embodied in what people do and expect to do, we are beginning to understand people in terms having much more direct meaning in three dimensions."⁴⁰

The problem is, the very fact that our needs/expectations/wants are so embodied within our general environmental experiences, as *designers* it is difficult to separate them out even for ourselves. In one sense Perin's conceptualisation of the problem is not entirely dissimilar to Grillo who identified a misinterpretation of the meaning of function in design with a lack of appreciation of the link between 'character' and 'activity'.

The idea of 'reducing' user expectations to a set of behaviours, ties in with Appleton's model of primitive behaviours and its development by this thesis for providing a 'side view' detailed look at 'exploratory' behaviour. The question of 'how' to design with the user in mind remains problematic, but from the investigation conducted so far, it is clear that the visual-spatial approach is the key facilitating mechanism for introducing new aspects of place. The ability to observe is therefore essential.

Observation

Appleton was cited earlier for making reference to Dorothy Wordsworth's shift in perceptual thinking when she accepted 'scientific' observation not as a conclusion in itself, but as a premise for further detailed enquiry. Essentially, observation is about seeing what is really going on.

Paco Underhill, the retail ethnographer, has a mantra which states 'the obvious isn't always apparent,'⁴¹ since in applied observation, what is *actually* happening can be quite different to what we *think* is going on and unexpected, accidental discoveries often occur. According to Underhill some people are better observers than others because observation is both an innate and an acquired skill. Underhill cites the advantages of using creative artists and writers over psychology students because they have no scientific theories to uphold but they have skills rooted in an ability to observe. In the context of the current study, it is the spatial theories of design that landscape architects uphold which creates the problem.

⁴⁰ *ibid*, p 74

⁴¹ UNDERHILL, Paco, *Why we buy. The science of shopping*. Touchstone, New York, 1999, p19

The landscape design approach has concepts, tools and techniques which preclude behavioural aspects of place exacerbated by the fact that our lens on the world is 'biased'. To be able to make observations which seek to conceptualise the environment from another's perspective, entails a deliberate and conscious effort. For integrating behavioural observation with spatial analysis, Lynch uses the analogy of the undercover detective 'tracking his quarry'. This also recalls to mind a suggestion made by Forman in the context of landscape ecology for the need for 'landscape detectives' to identify the processes that form underlying patterns in the landscape. Most of all, in order to judge the level of 'fit' between environment and humans, according to Lynch

"One needs to know both what people actually do and also what they experience....Empathy is the beginning of understanding..."⁴²

In the context of the current study, empathy entails the identification with and understanding of another's situation, and motives, but in relation to what is observable.

5.4.1 Recording environment-behaviour observations: applicability of methods to design

As stated by Schön, 'seeing' is not enough – rather, "the adequacy and utility of his new view must still be discovered in action."⁴³ As with drawing and mapping in the visual approach to landscape analysis, the recording of observations – whether spatial, behavioural or otherwise - is part of observation itself and this constitutes the first step towards processing and analysing 'data' that is gathered during the site survey stages of landscape analysis and design.

Traditionally, basic recordings are done in plot form on a map. For example, the recording device suggested by Cooper-Marcus/Francis is the activity map (figure 5.4.1.i). For activity mapping Cooper-Marcus/Francis suggest that actual activities are observed for at least four separate half-hour periods, ideally on different days at different times. They suggest keeping a complete record of all that is happening in the space – by age, sex, ethnicity, type of activity, and location. The method also suggests choosing a route that will pass sequentially through each part of the site on each walk-through, stopping to record by dots on one plan the exact location of all the people in the space using a system of notation to distinguish between stationary people, people on

⁴² LYNCH, Kevin & Hack, Gary, *Site Planning*. The MIT Press, USA, 1984, 3rd Ed, p,74

⁴³ SCHÖN, Donald, A, *Educating the reflective practitioner : toward a new design for teaching and learning in the professions*. Jossey-Bass, San Francisco, 1987, p 68

Selective observation, on the other hand, as originally described by Lynch⁴⁴, is a particular type of observation technique more suited to the designer's needs. It is, by its very nature, narrow in scope, but because of this, is rapid and effective. Selective observation analysis considers the physical setting as something which blocks or facilitates intended human activities, eg finding the entrance to a forest site. It focuses on the 'cause and effect' phenomena that are related to the spatial structure of the setting and all the physical elements within it. This is effectively integrated spatial-behaviour analysis.

Selective observation in spatial-behavioural analysis

Lynch was a key figure in shifting thinking towards integrated spatial-behaviour analysis:

"The commonsense procedure is to watch a place at length – perhaps to join in its activity – and then to summarise that activity ... The method needs patience and a good eye for relevance... Generalised observation can be sharpened by looking for particular kinds of action, which can then be represented diagrammatically. For example, one may concentrate on the movement of people and look for the things that influence that movement: the behaviour at decision points, the barriers and the attractants, the origins and destinations, the involuntary delays and detours, the wayfinding behaviour, the maintenance of personal space while moving, movement conflicts, and so on. ... This type of analysis is thus directly linked to the physical analysis of setting..."⁴⁵

This was a very key step towards the development of a useful integrative theory for landscape design. Lynch introduced this as a way of focussing the generalised study of behaviour in the environment-setting and utilising it as a research method for planners and designers. He proposed using it as a method for evaluating the quality of the environment directly in terms of behaviour, however, crucially, he states the objective of this type of analysis, to record behaviour as a spatial phenomenon. This marks a fundamental shift in thinking. Thus, hidden away in text book theory, Lynch provides the key to addressing the behavioural science/landscape design gap problem in the site survey situation.

Towards identifying how spatial-behavioural phenomena may be identified through the use of selective observation in behaviour mapping, and thus, make better use of activity mapping for design purposes, an example is provided by Gehl who suggests the plotting of 'points of attraction' in a shopping street (figure 5.4.1.ii). The approach is conducted in 2-dimensional plots, and highlights a means of identifying phenomena through

⁴⁴ LYNCH, Kevin, *Managing the Sense of a Region*. The MIT Press, Massachusetts, USA, 1976

⁴⁵ *ibid*, p 108-9

‘attraction analysis’. This study was conducted along Copenhagen’s main pedestrian street Strøget, the analysis being based on an investigation of where pedestrians stopped on the walking street and *what* they stopped to look at.



Figure 5.4.1.ii ‘Attraction analysis’ – attractions recorded on a pedestrian street in Copenhagen. (GEHL, J, 1987, p 30)

The attraction analysis effectively establishes a cause-and-effect relationship between window display and people’s ‘stopping’ behaviours. Gehl notes that the fewest stops were in front of banks, offices, showrooms, and ‘dull’ window displays, (citing ‘office furniture’, ‘porcelain’ and ‘hair curlers’), whilst the greatest number of stops were noted in front of shops and exhibits that had a direct relationship to other people and to the surrounding social environment, such as newspaper kiosks, photography exhibits and toy stores. This is explainable in environmental psychology terms, as ‘attention/understanding’: that which attracts our attention most is that which we are best able to understand.⁴⁶

It is common for environment-behaviour researchers to emphasise the social rather than the spatial interrelationships in a study. In Gehl’s study the most interest was shown in human activities taking place on the street itself – that is, people watching other people. Gehl explains that the human brain is more predisposed to deal with social matters than the nature of the physical world and this explains the preferences displayed by the people observed in his study. However, the designer’s concern should be focussed on the social aspects of space that have a direct relationship with the *physical* design of a place. Therefore this type of study would be most useful if it could highlight the role that spatial attributes of the setting have to play in the human/environment interactions observed. In this example, design aspects would be the shop façade design (the size of the window, its position in relation to the street arrangement and so on) and the street

⁴⁶ SINHA, Amita (ed), “Landscape Perception Readings in Environmental Psychology”, London Academic Press, 1995

and pavement itself (perhaps its width) *in conjunction* with other environmental and human factors such as crowding and traffic. The physical factors that facilitate the activity of, in this instance window shopping, would essentially constitute the 'interface' as described by Norman.

Application of the interface concept for 'evaluation in action'

Norman suggests that the interface concept provides the most useful way of objectively analysing and describing the causal relationship between environment and behaviour. The utility of the interface concept in combination with selective analysis, whether in a shopping street, tourist-historic city or forest setting, appears to be that it facilitates analysis of the spatial setting in terms of whether the setting can support or inhibit human/environment interactions within a particular 'scope of user need'.

In terms of environmental 'content', selective environment-behaviour observation analysis can draw attention to the smallest of details that can make a big difference to the human 'usability' of a place. We come to know about these through observation based studies such as those conducted by Gehl and others who study human interactivity in environment-settings. Paco Underhill, the retail ethnographer, notes:

"The fact that a minor alteration can bring a major improvement should come as no surprise. After all, science is by and large the study of very small differences. Critical truths are discovered that way."⁴⁷

Underhill's type of study in the shopping environment entails a highly focused approach where observation based study is used to establish the critical factors – whether relating to other humans, the physical placement of goods on a shelf, their packaging, the lighting or spatial arrangement of a shop – that have an influential *effect* on whether or not the shopper makes a purchase. The desired outcome is that the shop and its goods are displayed to optimise the possibilities for translating the 'browsing' shopper into a 'purchasing' shopper. To transpose this type of end-point focussed approach to the recreational open space setting, one might analyse a place for whether it helps or hinders the visitor when entering a place, and then on entering, whether the space provides the conditions conducive to encourage the user to spend further time exploring and/or using the place. The issue of 'spending time' in outdoor space is related to the concept of 'choice'. Each of these concepts will now be reviewed, each briefly in turn, in the context of the use of open space:

⁴⁷ op cit, UNDERHILL, Paco, 1999, p243

a) 'Spending' time

It was highlighted by Gehl that the more a space can provide people with opportunities for 'optional' activities, the more people will *spend time* and that this is a good thing. However, application of such generic statements need to take specific consideration of the experiential aspects of place. For example, quite often in a forest park recreation experience, a design arrangement that encourages visitors to spend time in the immediate arrival area of a forest park can cause problems. For example on a number of occasions it was found during site visits conducted for a wayfinding study⁴⁸ that some key attractions at forest sites were missed out by visitors who had not been aware of their existence, either because it was not obvious on arrival what the site had to offer, or because users were aware but could not find them. Such problems could be a difficulty in being able to find where the walks start, or finding a viewpoint.

A site's key attraction, whether spectacular view, a waterfall, a river boardwalk, adventure playground in the woods, or simply its woodland walks, is, from a forest manager's point of view, a site's main 'pull factor' (to use marketing terminology). From a landscape architect's perspective in the experiential paradigm, this is a site's 'essential character'. If a visitor were to visit a site and leave at the end without having experienced its key features, an indifferent impression might be implanted, resulting in failure to make a return visit, or, failure to pass on their experience to others by word of mouth. It is such factors that ensure outdoor spaces are well used.

The use of 'spending time' as a principle for user centred design could be used to full effect in the forest park situation, if considered for use with selective observation to analyse whether a site's design helps or hinders visitors' ability to interact with (or, experience) the key characteristic features of an open space setting at a given site.

b) Choice

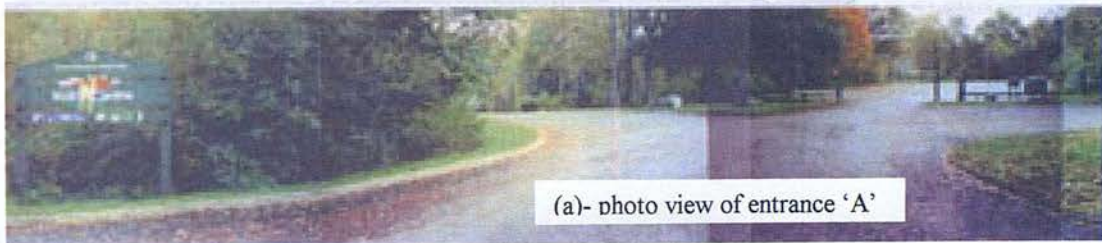
Whyte emphasises the role of 'choice' in the design of spaces – for example in terms of seating. Again, application of such criteria for design quality needs to

⁴⁸ as conducted for OPENspace the Research Centre for Inclusive Access to Outdoor Environments, Edinburgh College of Art/Heriot-Watt University, 2000-2003 (study commissioned by the Forestry Commission).

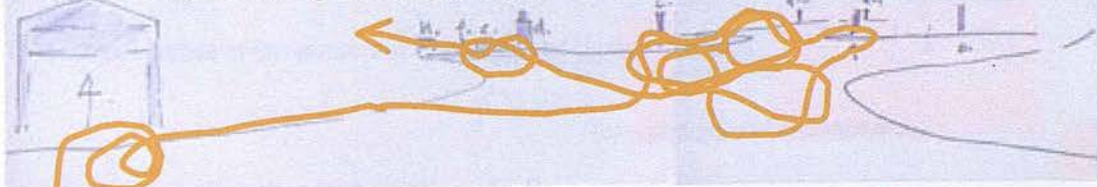
take account of its context of use. For example, on immediate arrival by car into a forest or countryside park from a busy road, if a driver is confronted with too many choice options as to which way to go, whether because signs are lacking, are unclear, or give too much information, or whether there is a problem related to the 'silent' message of the spatial arrangement, if there is poor 'legibility of use' a visitor will stop and pause whilst trying to make sense of all, or the lack of, information he/she is faced with, causing traffic to back up. In this situation *lack* of choice can be more useful to the visitor, and in this example, a key criteria for safety. This issue is illustrated below in some simple comparative analysis of two entrance-types 'A' and 'B' below.

ENTRANCE 'A':

When analysing the forest entrance below for its legibility of use, visitors' driving behaviour indicated that this is a difficult entrance to use.



(b) – sketch outline of the entrance arrangement, signage locations and typical points of hesitancy observed in visitors arriving by car (indicated by the orange line).



(c) – plan view:



A typical 'arrival' behaviour at example A: the orange 'loopy' line indicates points of uncertainty, where drivers were 'visibly' confused: at these points drivers stopped and/or began to change direction but then changed back before finally realising which way they were supposed to go. There are a number of choice options

Figure 5.4.1.iii (a),(b) and (c): Example of an entrance difficult to use. At entrance 'A' the 'loopy' line indicates points of uncertainty. Here, there are many choice options, but this does not help.

here, but none clearly say 'this way in'. On speaking to some of the drivers afterwards the existence of the problem was verified, users generally saying they wanted 'a big arrow' or other simple information to help them know immediately which way to go. This compares with example 'B' below, which provides an example of an entrance where there is clearly only one way in.

ENTRANCE 'B':

Contrasting with Entrance 'A', typical 'arrival' behaviour at example 'B', illustrated below, indicated no points of hesitation: here visitors were observed driving straight into the car park.

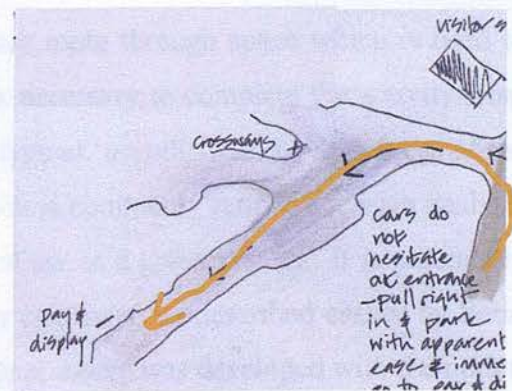
(a)- photo view of entrance 'B':



(b) – sketch outline of the entrance arrangement, and signage locations.

(c) – plan view of entrance area:

A typical 'arrival' behaviour at example B: the orange line indicates an entrance that is easy to use: there is a high legibility of use because it is clear where to go and how to get there, and, there are no other visible, options which makes it simple and easy for the user to know which way is in.



Thus, in this context, lack of choice is a good thing, because it makes the arrival experience uncomplicated.

Figure 5.4.1.iv (a),(b) and (c): Example of an entrance that is easy to use. At entrance 'B' the simple continuous orange line shows no points of uncertainty in a typical pattern of arriving behaviour.

So far, this thesis has determined that designers need to be able to generate an internal model which represents the *system image* of a place, which is sufficiently ‘evidenced’, and yet which does not rely on a structured social survey. Norman’s approach which embodies principles and procedures used in ergonomics and product design, such as the interface concept, natural mapping and the cause-and-effect principle, helps in the process. Christopher Alexander’s pattern analysis approach should also be referred to: he intended to provide an approach by which a problem is deconstructed from a set of physical and social relationships which are required to solve the stated problem, which the designer should then put together (or build). The intent of Alexander and Norman alike was to help the designer know ‘how’ to design with user needs in mind and this is a markedly different approach to the type of research which identifies a list of user needs.

Human computer interaction studies (HCI) give great emphasis to evaluation. There are different approaches described in the literature ranging from ‘expert opinion’ which requires least effort and non-user participation, to ‘observation’ and ‘survey’ which include users, to the most powerful approach recommended which is ‘experimental’.⁴⁹ In reality, different combinations of approaches become used in such evaluations. The point to made in the context of the current thesis, is that the ‘path concept’ is key to HCI evaluations: in these, a task analysis approach is generally emphasised.

The path concept

In HCI task analysis ‘the path’ is an imaginary route through space which is used to deconstruct the route into a sequence of tasks necessary to complete the activity from beginning to end. HCI evaluation, which is a type of ‘usability’ study, makes use of the ‘the path’ as an analytical tool.⁵⁰ The approach is commonly termed scenario analysis because it helps structure different scenarios of use in a given system. It is practically identical to, and yet different from, behaviour circuitory, as described earlier by Perin for use in physical space: whereas Perin’s original theory was developed with the notion of discovering the *existing* use of a space – how it actually is - task based scenario analysis, as structured using the path concept, emphasises a way of conceptualising how a space *might* be used. In particular the scenario analysis approach is most helpful to a

⁴⁹PREECE, Jenny, A Guide to Usability – Human Factors in Computing. Addison Wesley, UK, 1993

designer as a way of focussing on the human cognitive processes at work when moving through space - notably the user's decision making in relation to incoming environmental information. Useful application of the path concept in landscape architecture as an information gathering tool in the design process for focussing analysis on a particular route through a space, and/or scenario of use, should be emphasised. Scenario analysis can potentially help a designer to 'test' a place which does not yet exist because it is yet to be designed and built. The utility of scenario analysis for introducing predictive thinking in design is explored in greater detail later in the thesis, in chapter 7.

It has already been stated that information gathered to surplus is not helpful to the designer spatial-behaviour approach. In conjunction with selective analysis Lynch's 'diagram of shifting activity' illustrated in figure 5.4.1.v records 'one instant' in a flow of activity in a simple datasheet.⁵¹ Although Lynch demonstrates its use by observing a user by 'tracking' their activity, this can be used through role play in 'imagined behaviour'.

The use of selective analysis for embodying the product design approach towards representing a 'system image' of place and so shifting the traditional visual-spatial approach to landscape analysis towards integrated spatial-behavioural analysis, should be further explored.

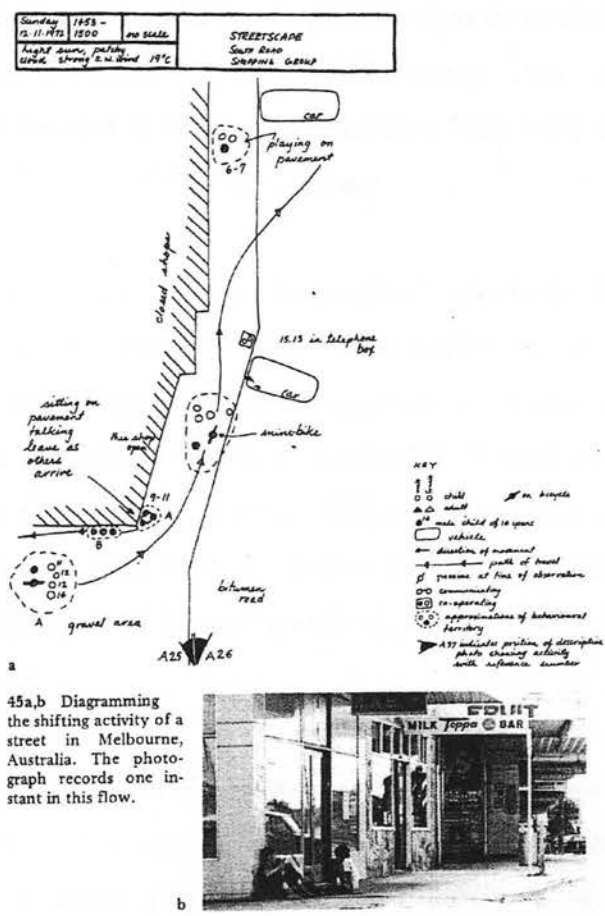


Figure 5.4.1.v: Diagramming the 'shifting activity' of a street in Melbourne. (LYNCH, Kevin, 1976, p 149)

⁵⁰ op cit, PREECE, Jenny, 1993
⁵¹ op cit, LYNCH, Kevin, 1976, p 149

5.4.2 Applicability of product design principles in landscape design

Plate 5.4.2.i overleaf illustrates some simple analysis that was carried out with the explicit intention of assessing the usability of a site as a 'design product'. The use of observations and 'trace behaviours'⁵² (the foot erosion) were embodied in visual-spatial analysis.

The spatial configuration at this particular forest park setting around the transition area from road into the car park and the visitor arrival area, together with its contents, were analysed using the interface concept as a viewing 'lens'. By spatially analysing the place from a first time user's perspective and imagining first impressions on arrival, the analysis became focussed on identifying, firstly, the specific factors (the 'silent messages') that helped or hindered the user in making the transition from road to the site in the first instance and, on arrival, the 'usability' of the space.

The site's 'usability' was assessed in an 'evaluation-in-action' approach where functional problems were identified by analysing the 'cause-and-effect' spatial-behavioural relationship between users and the physical setting, whilst at the same time imagining possible design solutions (embodying the use of 'feedback'). The photo and accompanying sketch show the site during a quiet period. William Whyte stated that this is a useful time to make observation since users' environmental preferences (such as preferred seating areas) can be determined because people sit for example, where they choose to, not where they have to.

The use and application of different concepts when embodied in the thinking process, are difficult to express in a simple sketch without the use of words, therefore an explanation is provided as follows where two key functional problems can be highlighted from the example:

⁵² as described by COOPER MARCUS Clare, and FRANCIS, Carolyn (eds), *People Places*, 2nd Ed, John Wiley & Sons, Inc, USA and Canada, 1998

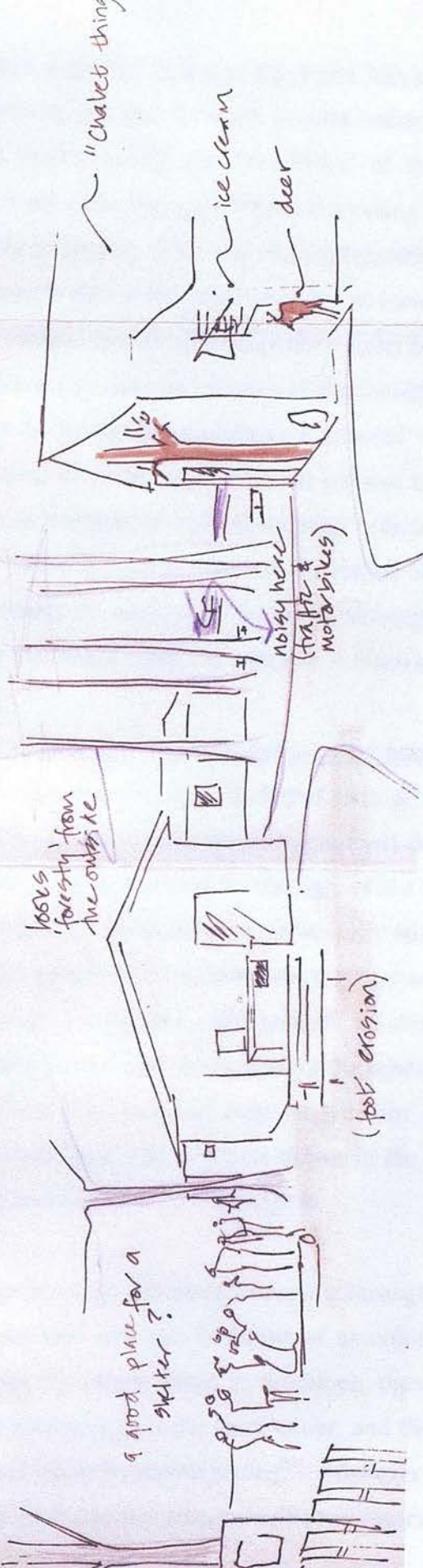
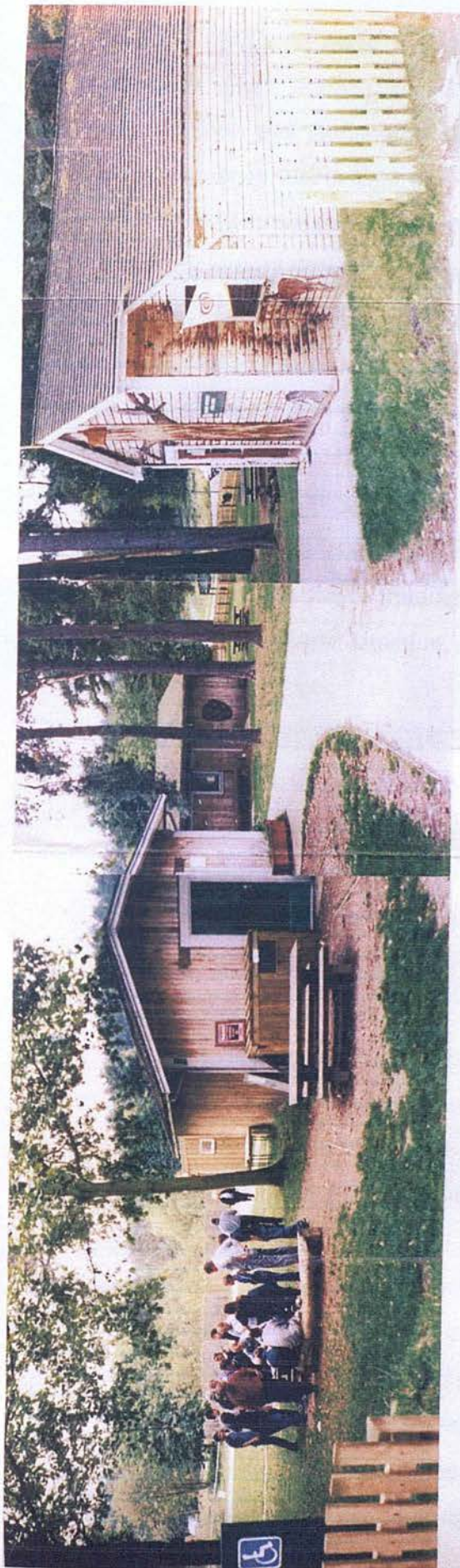


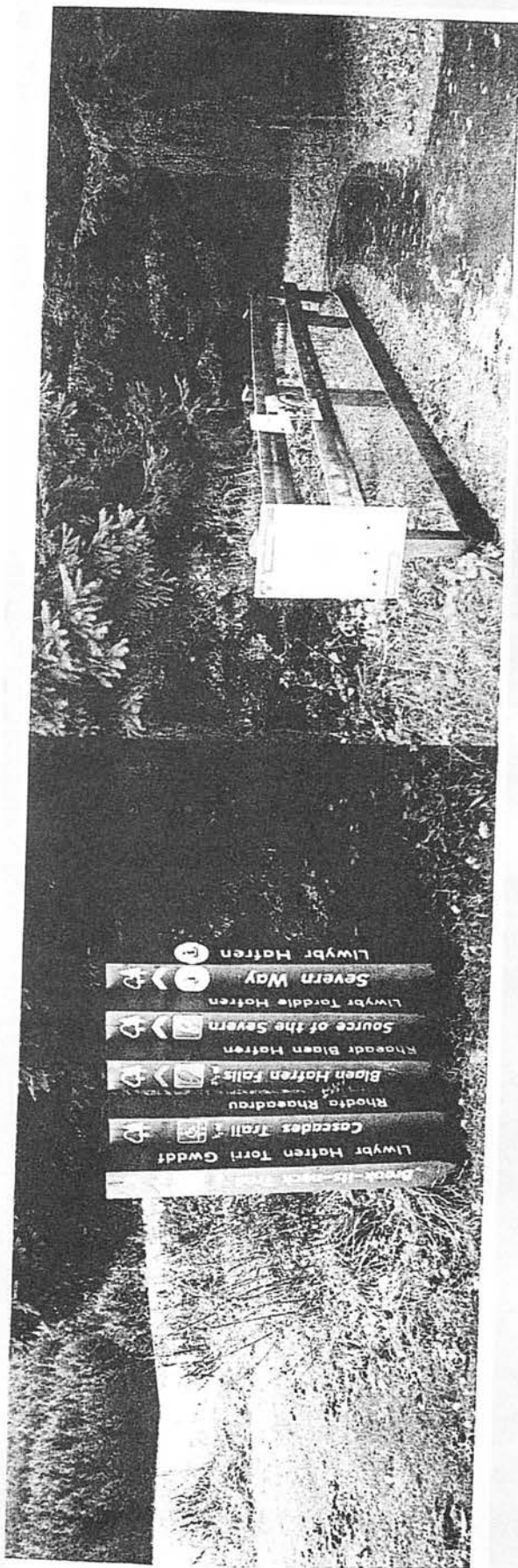
Plate no 5.4.2.i – Assessing the usability of a forest park arrival area as 'design product'.

a) users unable to make a 'natural mapping' between the toilet block and its function: by simply standing and observing linkages between peoples behaviour and the configuration and contents of the spatial setting, the 'invisibility' of the toilets became apparent: it was evident that people were having problems in locating them by the fact that visitors were asking for help in locating them, and expressing exasperation out loud. Looking at the site from the user's view at the point entry, it was seen that the toilet did not look 'toilet-like'. When comparing this with other sites, toilet buildings that did not cause confusion were highly visible not just because of the building itself but because of the prominence of the use of the standard 'ladies/gents/disabled' symbols displayed clearly on the side of the building, or a clear sign that made a visual link with the toilet block and its function. This is an example of 'natural mapping' which, in this instance, the user was not able to make. (**Plate 5.4.2.ii** provides an illustration of 'good' natural mapping in relation to 'finding where the walks start' in which, although it is a different task, in a different situation, at a different scale, the principle is illustrated).

b) a poor design response to experiential site factors for human comfort needs: the sketch (in **plate 5.4.2.i**) also indicates that the most preferred area of use for sitting and spending time (where the group of users are photographed) does not coincide with the main seating area actually provided (to the right of the photo). At this site the road running alongside can get quite noisy particularly since it is favoured by local motorbikers. The behavioural observations, together with the 'trace' evidence shown in the worn grassy area, and general sensitivity to localised experiential factors, indicate a more appropriate area for the benches and seats to be laid out, together with a new path and even an area for shelter construction, towards the front and left hand side of site as shown in the photo, rather than the current layout which users are expected to adapt to.

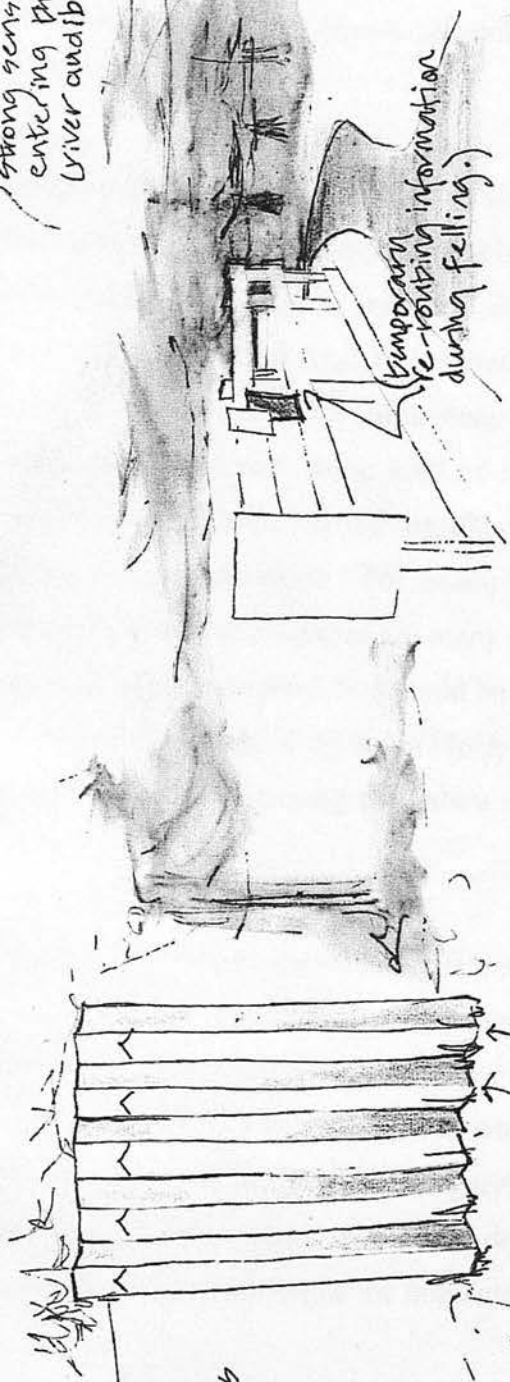
It is notable that in its history, ergonomics has been described as passing through three phases which can be compared and contrasted with the evolution of environmental design: firstly ergonomics focused on making people adapt to machines; then there came a focus concerned with modifying machines to make them easier; and then the final, current phase became focussed on the whole behaviour setting⁵³. However in the environmental design disciplines although there may be increased self-consciousness

⁵³ LANG, Jon, Creating Architectural Theory. The Role of the Behavioural Sciences in Environmental Design. Van Nostrand Reinhold, USA, 1987



strong sense of
entering the forest
(river audible).

"a gateway"



temporary re-routing information
during felling.

all walks
start
here.

source of salmon & Severn Way are one & the same

Plate no 5.4.2.ii – An example of 'natural mapping' at work: here the arrangement creates a forest 'gateway' effect, communicating to the wayfinding user that 'all walks start here'.

about what designers are doing, we continue to design within the mode of thinking that equates with 'making people adapt to machines'. Environmental designers at large, it seems, continue to believe that their intuitive understanding of human physiology is good enough for design.⁵⁴

The forest site analysis took place in the context of a wayfinding study in which users were also interviewed. Because of this, some in depth analysis of suspect problem areas helped 'evidence' where problems lie, for example, in talking to users the issue of finding the toilets came up. In other words, this enabled the designer/researcher to 'know' with certainty what the problems were. However, had the research study relied on interview analysis alone and not been contextualised with some kind of spatial analysis, although the problem of finding toilets would be identified, the specific *nature* of the problem is very difficult to elicit through interview alone. For example the problem with finding the toilets could be caused by a lack of a sign, or too many signs, or a sign in the wrong place, or a sign giving confusing information, or it could be to do with the layout of the site, lines of visual access or the design of the toilet block itself not communicating to the user its function, and so on. By knowing the *nature* of the problem, appropriate solution types can be identified.

To rely on a designer's own personal response to place using spatial analysis without behavioural or interview analysis is likely to generate a distorted 'system image' of place. Clearly, the ideal is to incorporate a variety of methods to ensure an accurate portrayal of the system image, but the challenge attempted by this thesis, is to address the gap problem from a starting point which acknowledges the fact that designers are designers, not social scientists. In addition it is acknowledged that much design inspiration takes place during the site survey as initial first impressions are implanted in the mind.

When approaching the landscape study from a combined spatial-behavioural point of view, the interface concept is a key facilitating mechanism which helps analyse a setting in terms of 'cause and effect'. If 'behavioural' considerations are incorporated into the same process by which 'spatial' information gathering takes place, the designer carries out the same actions but with a different intent. In this way spatial analysis remains the

⁵⁴ op cit, LANG, Jon, 1987

core ‘doing’ activity whilst behavioural analysis becomes embodied in the thinking process: this is designing *with the user in mind*.

This thesis has highlighted the fact that environment-behaviour research to date appears to have been ineffective in providing the designer with appropriate knowledge, in a usable form for design. The structural nature of the research/design gap problem and the general lack of communication and understanding between the two spheres is a particular aspect of the problem.

5.5 THE RESEARCH/DESIGN COMMUNICATION GAP

Researchers are expected to develop specialist knowledge. As a consequence, Schön suggests that the researcher traditionally sees his role as more ‘important’ than the designer.⁵⁵ This has tended to be reflected in the normative curriculum of teaching institutions, where the order of the curriculum parallels the order in which the knowledge is ‘applied’. Thus basic and applied science has been placed before the skills of application to ‘real-world’ problems of practice. Schön describes a model of ‘Technical Rationality’ in which ‘real’ knowledge lies in the theories and techniques of basic and applied science, and skills in the use of this knowledge, comes later. This is a model that has predominated in Western thinking and has influenced professional research and practice since it began in the late nineteenth century.

The original rise of science and technology was to apply scientific achievement to the well being of mankind.⁵⁶ The legacy of this approach is a research/practice relationship in which practitioners are expected to provide the problems for researchers to investigate and test the utility of research results, whilst researchers are supposed to provide the basic and applied science from which to derive techniques for diagnosing and solving the real world problems of practice. This thesis suggests that not only should designers be providing the techniques, but also they should be actively engaged in identifying the problems. Lynch had recognised such a need when he produced his publication ‘Managing the Sense of a Region’ in 1976.⁵⁷ Here, he identified a range of specialist techniques to help in the experiential approach to environmental design (which he termed ‘sensory’) in the form of a ‘Glossary of technique’. This comprised a

⁵⁵ SCHÖN, Donald, A, *The Reflective Practitioner: How Professionals Think in Action*. Temple Smith, London, 1983

⁵⁶ *ibid*

⁵⁷ *op cit*, LYNCH, Kevin, 1976

Barry⁵⁸ provides further insight into the nature of the research/design communication gap problem. She refers to a phenomenon termed “fuzzy logic”.⁵⁹ Fuzzy logic explains how language can only approximate meanings. This is because in human cognitive development, ‘words’ come later than ‘images’. Visual, verbal and mental images are tied in with our experience of the world and although each are *experientially* related, ‘words’ are inadequate to communicate in precise terms our ‘images’ because the words are removed from the experience: words lack the immediacy and power of the real world.

Barry explains how brain imaging data has revealed that thinking in images is different from thinking in language, and imagery and verbal thought have different behavioural consequences. In the ‘fuzzy’ area between *statement* of ‘reality’ as provided in science and reality itself, meaning becomes lost. Words, Barry states, can only approximate what visual images express, and thus words represent an ‘artificially imposed intellectual system removed from primal feeling’. Images on the other hand ‘plunge us into the depth of experience itself.’

Research protocol traditionally demands that ideas, theories and findings are disseminated by the written word. Barry states that it is only under the most formal situations of writing or speaking that the system of formal language ‘works’. When used formally, we use language in a logical, linear fashion and the meaning is retained. However, when taken out of this context and presented verbally, the precise meaning is rapidly lost. Quoting from T S Eliot, Barry states that words are but “a raid on the inarticulate” and that each attempt to express the ineffable is a “different kind of failure”.⁶⁰

The fuzzy logic of research (in science)

When translating words into images, the meaning of the words is subject to personal interpretation. In their comments on the effectiveness of Criticism for the generation of theory in the environmental design disciplines, Sancar/Studer stated that in reality design theory is perpetuated through ‘diffusion’ rather than innovation in which condition it becomes established in policy and regulation. The consequence of this,

⁵⁸ BARRY, Anne Marie Seward, *Visual Intelligence. Perception, Image and Manipulation in Visual Communication*. State University of New York Press, Albany, USA, 1997

⁵⁹ *ibid*

⁶⁰ T S ELIOT, quoted in BARRY, Anne Marie Seward, 1997, p75

according to Sancar/Stuer, is that the role of science in design will prevail in the form of 'reduced slogan responses' unless scientific knowledge domains can become integrated into design criticism and theory development. Sancar/Studer, Hillier, Broadbent and Lang have all implied that innovation is critical to positive theoretical development. Innovation stems from creative or 'productive' thinking.

Knowledge and creativity

Arnheim states that productive thinking ignores the boundaries of 'art'. Edward de Bono⁶¹ states that creativity is needed within all disciplines. Although de Bono does stress that knowledge is *not* creativity in itself, he found a correlation between knowledge input and creativity: "within any particular field it is difficult to come up with new ideas unless you have some ideas to play around with in the first place."⁶²

According to Edward de Bono, shifts in thinking are facilitated by a 'blurry-brained' approach. This contrasts with a 'sharp brained approach' which, although it provides a pointed and focussed mind, is also narrow and lacking in creativity. De Bono describes sharp-brainers as fixed and rigid in their thinking and therefore unable to generate new ideas. 'Blurry-brained' thinkers however, are more suited to the creative approach to thinking, where the problem is not known from the outset.

Through de Bono's famous 'Black Cylinder Experiment' he studied one thousand different participants' thinking processes in relation to a given 'problem'. Participants had to find an explanation for why the black cylinder which was put in front of them fell over for no apparent reason. Through studying the different explanations ranging from 'artistic' to 'scientific' professionals, he concluded that too much knowledge kills off creativity – see graph below, figure 5.5.ii. This is apparently because too much experience within a field may restrict creativity because "you know so well how things *should be done* that you are unable to escape to come up with new ideas."⁶³ The graph below shows that with increased informational input there is an associated increase in creativity only to a certain point and then a decrease occurs. Thus there is a 'trade-off' in creativity as knowledge over time in any particular area increases.

⁶¹ DE BONO, Edward, Practical Thinking. Jonathan Cape Ltd, London, 1971,

⁶² *ibid*, p 169

⁶³ *op cit*, DE BONO, Edward, 1971, p 172

The graph effectively highlights the importance of attaining a balance in gathering enough information to make creative leaps without trailing off into, what is commonly termed, ‘analysis paralysis’. The potential for integrating behavioural theory into spatial analysis without compromising on a designer’s creativity, can be found in Lynch’s work: he had highlighted ways in which ‘information’ derived by ‘scientific’ means can be utilised *creatively* in design thinking through the use of visual-spatial analysis (as shown earlier in figure 5.5.i.).

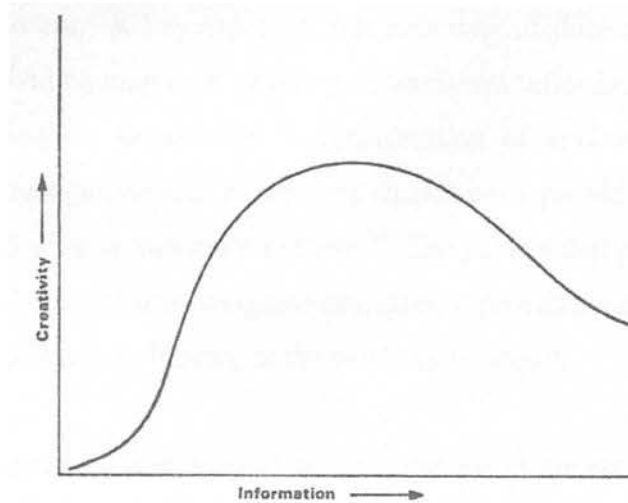


Figure 5.5.ii – Graph showing the correlation between creativity and information input as knowledge is gained over time. (DE BONO, Edward, 1971, p 170).

This thesis suggests that useful concepts for integrated spatial-behaviour analysis may be found by revisiting first principles established in environment-behaviour theory as derived from environmental psychology. These will be examined for their compatibility with spatial theory.

5.6 KEY CONCEPTS - ENVIRONMENTAL PSYCHOLOGY

At more or less the same time in history as the ‘ecological’ influence came to impact on the social and artistic conscience in landscape design during the 1960s/70s, a major shift in thinking in the behavioural sciences also occurred. When psychologists came to realise the intrinsic relationship between ‘man’, his physical setting and his behaviour this generated an area of study initially termed ‘ecological psychology’, now termed environmental psychology.

As referred to earlier, a changed concept of place emerged during the 1960s/1970s in the environmental design sphere. To environmental psychologists, ‘place’ now became

a core concept and it came to represent the integrative nature of the relationship between people and their physical setting. This is the transactionalist perspective, and is at the foundation of mainstream environment-behaviour research.

The transactional perspective

In its early days, *ecological* psychology was a reflection of the new way of conceptualising man's relationship with his environment in which man was seen as part of an holistic system. A key aspect of this new way of thinking was the idea of the environment providing man with certain environmental 'affordances'. The significance of this transactionalist perspective in consideration of environmental design theory building, is the recognition that experience shapes what people pay attention to in the environment and what is important to them.⁶⁴ Lang states that positive theory building in environmental design must recognise this, since it provides a conceptualisation of the world which is different to looking at the world as an object.

Another key factor of the transactional model is that places are not examined as something in flux and changing over time. According to Altman and Rogoff⁶⁵ the transactional view shifts research approaches from 'analysis of the causes of change to the idea that change is inherent in the system'. These core concepts form the basis of ecological thinking which pioneered new approaches to behavioural research in the 1960s/70s: the physical setting for behavioural research which, in times previous, had occurred in the laboratory now became transferred to the real-life setting. This shift in thinking is largely attributed to the psychologist Roger Barker. In his children's behaviour in the early 1960s, he realised that the environment has a 'bounded' nature: out of this discovery emerged the 'behaviour-setting' concept.

5.6.1 Ecological psychology and the behaviour-setting concept

Barker's work presented a major turning point in research in the then developing field of ecological psychology in the 1960s. After some intensive observation and analysis of child behaviour in its natural habitat, a radical result came out of the research: Barker and his team found that the behaviour of the same children changed markedly as they

⁶⁴ op cit, LANG, Jon, , 1987

⁶⁵ ALTMAN, I. and B. ROGOFF, "World Views in Psychology: Trait, Interactional, Organismic, and Transactional Perspectives." in Handbook of Environmental Psychology, New York, John Wiley & Sons, no 1, 1987, pp 7-40.

left one environment and entered another. They found that not only did behaviour of the same children differ markedly from setting to setting but also that different children in the same setting displayed high behavioural similarity. In other words:

"While child-to-child variety existed for any particular moment, over the long pull, settings had their way with their inhabitants. Settings were coercive"⁶⁶

Barker observed that, within a given environment-setting, there was a degree of constancy in the influence it exerted on individual humans. He found that the environment had more influence on [children's] behaviour than individual personality difference. He adopted the concept of the 'behaviour setting' as a unit for analysis which enabled him to study the *interaction* of a child (human) with his environment, rather than the previous approach which focussed on *the child (human)* itself.

The fact that it was now possible to identify a cause and effect linkage (interdependence) between the environment and behaviour, led to a significant methodological and theoretical shift. Once it was accepted that the environment influenced behaviour, serious scientific attention was turned to questions of how this environment might be described. What Barker and his team went on to develop was a way of conceptualising his environment-behaviour 'unit' as a way of identifying, measuring and analysing it, and developing a theoretical basis for explaining it.

The behaviour-setting concept was significant in the developing area of environment-behaviour research because it instigated a shift in thinking about the nature of the human/environment relationship. This essentially conceptual shift occurred when Barker began to question what happens when we (researchers/scientists) do not impose our units of life and instead ask what are 'its' units? As a result he developed the 'behaviour setting survey' which provided a theory, a concept *and* a technique for studying human/environment interactivity.

⁶⁶ GUMP, Paul V, "The Behavior Setting: A Promising Unit for Environmental Designers", *Landscape Architecture*, January 1971, p 131

A new ecological unit of study for analysis

Not only did Barker conceptualise a new 'ecological' unit of study (the behaviour setting), but he also developed a tool (the Behaviour Setting Survey) for describing this unit and its properties. The behaviour setting survey enabled a sort of 'inventory' of environment-behaviour interactions to be compiled. This approach is highly methodological and involves a numerical scoring system.

Although common sense can identify most behaviour settings, Barker devised a 'structure test' to identify whether two behaviour settings are actually separated or constitute one single setting. This was a rating system used to measure the interdependence of the attributes (the 'parts') of a setting. The so called 'K' factor is the key measure of interdependence since if a single behaviour setting is in fact two sub settings (A and B) there would be low interdependence between the 'parts' but if a suspected two settings (A and B) are in fact one setting there would be high interdependence.

According to the original method, after an initial phase of 'scouting and mapping' that takes place over a long period of time using observation and survey approaches, the behaviour settings are identified, then classified by 'genotype' such as 'bus-stop', 'parks and playgrounds', or 'basketball games', then 'measured', and then catalogued. For example in Abou El-Ela's thesis she used a 'K-21' scale to measure attributes of behaviour settings she identified in open spaces in Cairo. She rated the settings on population, spatial, behavioural objects, molar action units (continuity of behaviour from one setting into the other), and temporal contiguity (the degree to which setting A and B occur at the same time or nearly the same time and similarity of behaviour mechanisms; bodily tasks). The scale consisted of seven sub-scales added together. Scores were assigned and the total score for each setting computed. If the sum was 21 or more, the settings were considered separate, if the sum was under 21, the settings were seen to be too interdependent to be separate, and if the sum was between 18 and 23 this was seen to indicate boundary problems. Figure 5.6.1 illustrates the type of calculation needed which, this thesis suggests, is far too statistical for the landscape designer to integrate with spatial analysis in the normal practice context.

Rating of Spatial Interdependence

This rating indicates the degree to which settings A and B use the same or proximate spatial areas. Rate on the following scale. In the case of scale points with two definitions, the most appropriate one applies; if more than one applies, give the lowest scale rating.

Rating	Percent of Space Common to A and B	
1	95-100	
2	50-94	
3	10-49	or A and B use different parts of same room or small area
4	5-9	or A and B use different parts of same building or lot
5	2-4	or A and B use areas in same part of town*
6	trace-1	or A and B use areas in same town but different parts of the town*
7	none	or A in town, B out of town

*Deciding how to separate a town or area into parts should not be completely arbitrary. Sometimes census tracts can be used. If a building is being studied, floors can be the "parts." Sometimes a town can also be divided into fourths.

Figure 5.6.1 – the 'K-21' method for calculating the degree to which behaviour settings are the same.

The *potential* of the basic concept of the behaviour setting to fit with the environmental designer's spatial approach was, however, recognised by environmental design researchers concerned with bridging the behavioural science/design gap. Notable researchers in this respect are Perin, Gump, Lynch and later Lang.

5.6.2 The utility of the behaviour setting concept

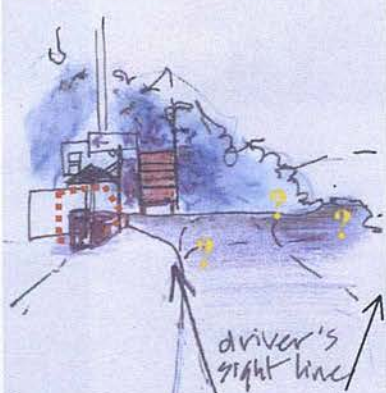
The basic concept of the behaviour setting is that human/environment interactions occur within settings of their own and each setting is set within a 'nest' of other behaviour settings. However, each unit can only come into existence if its boundaries are defined. This presents a problem:

"A behaviour setting boundary is where the behavior stops. An ideal boundary is a wall, which stops behavior from getting in and out. Such obvious qualities as opacity to sight and sound are important in setting boundaries. Yet it is when behavior setting boundaries are not so obvious that the problems of boundary definition occur."⁶⁷

⁶⁷ paraphrasing BECHTEL, Robert (1977) in LANG, Jon, *Creating Architectural Theory. The Role of the Behavioural Sciences in Environmental Design*. Van Nostrand Reinhold, USA, 1987, p 114

The boundaries of a behaviour setting are intangible even though they are 'synomorphic' (ie similar in structure) to the physical setting. Once the eye is 'tuned'

in, they start to become discernible - just as the spatial properties of the landscape start to come into focus when the landscape architecture student first develops an 'awareness of space'. The visual analysis in figure 5.6.2.i opposite is extracted from some sketch book style analysis of another site studied during phase I of the previously mentioned forest wayfinding study.



The driver's eye is naturally drawn towards a tourist accommodation sign ahead at this point (shown in brown solid) whereas the critical directional sign indicating the scenic route along which the forest park is located (in brown outline), is 'invisible' in the view from road - lost in a clutter of other signs.

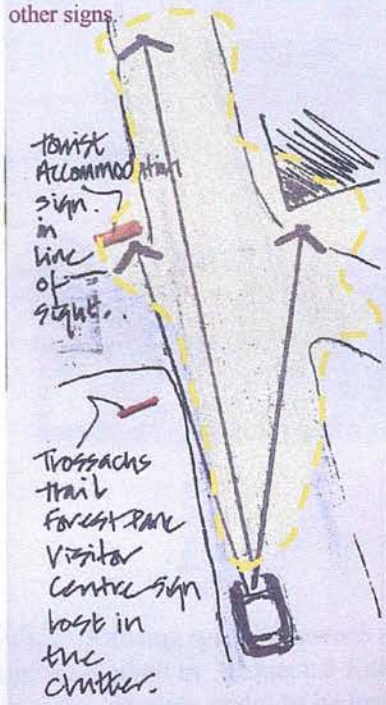
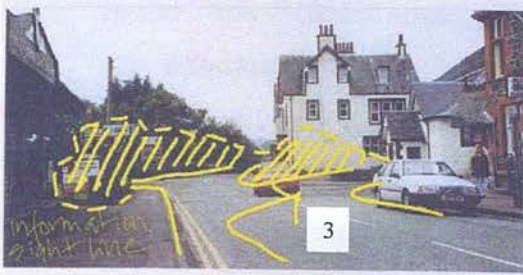


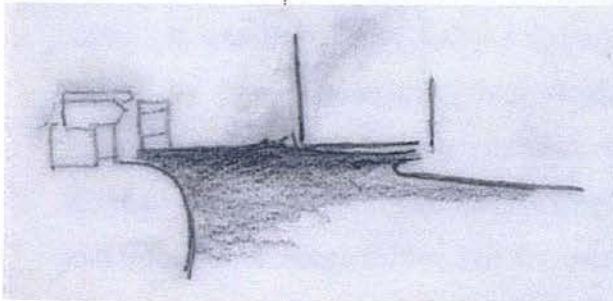
Figure 5.6.2.i: infusing visual-spatial analysis with the behaviour-setting concept.

The visuals shows how a 'spatial-behavioural' unit for analysis was 'mapped' when role-playing the first time user experience of trying to find a particular forest site located along a major scenic route. In this example, a suspect problem area along the roadside was located at a road junction: this is a critical decision point in finding the site. Figure 5.6.2.i, together with **plate 5.6.2** (overleaf) and this explanation, describe the thinking process behind the drawing where this researcher deliberately and consciously attempted to embody the behaviour setting concept into spatial analysis.

The visual analysis was conducted firstly at driving speed as a view from the road spatial sequence, and then at walking speed to compare the information that is visually accessible whilst driving, with the information that is actually provided. The basic sequence produced is shown in **plate 5.6.2**. The junction under analysis was a suspect problem area initially based on the researchers' own experience of finding the site as a first time user.



The critical sign
lost in clutter



Read up
↑

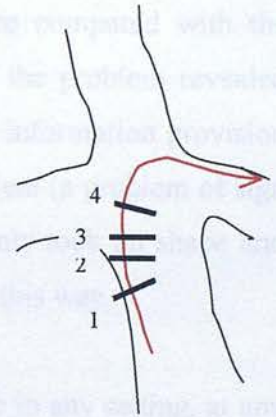
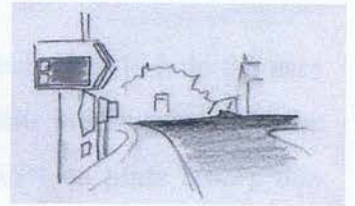


Plate 5.6.2 – Infusing spatial sequence analysis with the behaviour-setting concept: using a dynamic route mapping method in ‘sequential form’. Here the turning behaviour is ‘tracked’ using role-play. This allows the ‘decision node’ to be broken down, step-by-step allowing for analysis of the cues in detail. The environmental ‘interface’ may be mapped, that is spatially defined, in 2-d and 3-dimensional shapes.

The suspected problem at the junction was subsequently verified from an interview survey with visitors, together with observations of drivers seen momentarily hesitating at the turning.

The yellow shaded area shown in 2-dimensional plan form in figure 5.6.2.i, and shown in 3-d view in **plate 5.6.2** (image no 3), represents the area which occupies the sightline in the 'view from the road'. This highlights the area that the user would be 'scanning' for informational cues to help understand which way to turn at the junction. Significantly, this is the view from the *road in the context of the current scope of user need* – that is, a context of use defined by users' wayfinding needs. The yellow area could be considered an 'information sightline' which is effectively the 'interface' between user and the physical environment. Analysis of the interface narrows the scope of observation towards identifying the factors that help or hinder the user in accomplishing their wayfinding task.

When approaching this junction at driving speed, the environment fails to help the user decide which way to turn because, although there exists a clear bold sign stating the direction of the forest park and the scenic route (see image no 4 on **plate 5.6.2**), this critical sign is 'invisible' at driving speed because it disappears in a clutter of other signs. It was only when walking through the turning sequence, envisaging in detail 'frame by frame' what the driver would likely be able to see compared with the information that was actually provided, that the true nature of the problem revealed itself to the researcher. The lack of environmental fit between information provision and information accessibility, and the specific nature of the problem (a problem of sign clutter), was not immediately obvious. Rather, 'the problem' only took on shape and form once the driver's turning experience had been scrutinised in this way.

The approach described above should, in principle, be applicable in any setting, at any scale and at any speed, as a useful evaluative approach to design. The approach enabled the designer/researcher to make 'visible' the lack of relationship (that is, lack of 'natural mapping') between three things: the junction point, the road towards the site, and the directional sign itself. It also provides a useful 'dynamic' route-mapping method that fits with the landscape designers need to switch freely between 2, 3 and 4-dimensions, with the simultaneous analysis of a landscape's form and content, *and* the need to infuse spatial thinking with behavioural considerations.

For problem-setting, this type of approach would appear to be useful in two senses: in identifying the existence of a problem in the wayfinding 'system' related to the physical setting (in this instance an information 'gap') and identifying the *specific nature* of the problem (a problem of sign clutter). It is now but a short step towards identifying a number of possible design solutions to plug the identified 'gap' - for example by raising the sign, moving it completely or removing the clutter, to ensure this critical sign is visually accessible at driving speed. Whether or not the *content* of the sign is legible at driving speed (its lettering and symbols) is another issue altogether: this will be returned to later in the thesis.

Towards a useful tool

The visual spatial-behavioural simulation approach became useful for both *reconstructing* and *deconstructing* the route experience. Crucially, the spatial-behaviour route mapping approach (described on **plate 5.6.2** as a 'dynamic route mapping method') shows potential for incorporating user needs evaluation into the design process *whilst it is going on*. This is the aim of integrated spatial-behaviour analysis.

The integrated spatial-behavioural route mapping approach appeared to provide a useful approach to problem setting and analysing the user's experience when moving through the landscape – a road setting in this instance. The approach appeared to be effective, and thus useful, because the study was scoped within a particular area of user need - ie, the wayfinding experience – which narrowed the scope of the analysis.

The point of incorporating user needs evaluation into the design process is to enable designers to be able to predict the consequences of their actions. When making predictions – whether in design or any other sphere of operation – it is important however to recognise the limitations, as well as the potential, of the human capacity in this respect. In the field of business management, Dearlove states that although there is a degree of predictability around us, this exists alongside ambiguity and uncertainty and the skill is in the interpretation of each individual situation:

“...If we look at a new situation everything may look terribly ambiguous. The art is to find out how much of this ambiguity is due to ignorance and limited perspective and how much due to inherent uncertainty.”⁶⁸

In the sphere of landscape architecture, the suggestion is that interpretation has a significant role to play. With reference to James Corner’s work, Swaffield highlights an approach found in the hermeneutic tradition of interpretation as a way of generating knowledge that does not attempt to predict and control the world, but rather aims to develop a better understanding of it. Similarly, Eaton put forward a case for the role of the interpretive approach on the basis of understanding which accepts there are no absolute truths, only interpretations. Emphasising the interrelatedness of understanding, interpretation and application in landscape architecture, and with reference to Madison (1988), Eaton suggests the hermeneutic approach to interpretation helps avoid the ‘irresponsibility of complete subjectivity’ suggesting that, although one cannot ‘test’ interpretations, they can be evaluated.⁶⁹

It is notable that the hermeneutic perspective reconciles ‘the landscape problem’ that was originally set out by Meinig. He had conceptualised ‘the problem’ from two polarised perspectives: firstly the scientific ‘need to know more in order to understand’, and on the other hand a way of seeing the landscape problem in terms of a need to ‘correct’. It is between these two polar extremes that the interpretive approach bridges, mediates and reconciles, and thus, where the utility of integrated spatial-behaviour analysis lies. Since it is essentially a lack of ‘knowing’ in the environmental design disciplines in general that is inhibitory not only to the individual design process but also theoretical development within each discipline⁷⁰, then the ‘predictive’ capability of spatial-behaviour analysis should aim to help the landscape architect ‘know more in order to understand’. With this in mind, the application of *landscape* spatial-behavioural analysis, as explored by this thesis so far, suggests an interpretive/predictive tool in the making.

5.7 SUMMARY

This chapter explored the theoretical development of socio-behavioural knowledge, both its theory and its basic methods, in environmental design. The specific relevance of

⁶⁸ DEARLOVE, Des, *Key Management Decisions. Tools and techniques of the executive decision-maker*. FT Pitman Publishing, London 1998, p 69

⁶⁹ op cit, EATON, Marcella, 1997

⁷⁰ HILLIER, Bill, *Space is the machine : a configurational theory of architecture*. Cambridge University Press, 1996

the knowledge to landscape design thinking was critically examined, with a view to its compatibility with the visual-spatial approach, and its utility in the design process. To give 'the problem' shape and form, the DNA double helix was presented as a visual aide. This helped conceptualise an approach to exploring the problem, which could at the same time identify solution types in the form of theoretical bridges. The positivist approach to theory building was highlighted as being the most appropriate for generating new theory in environmental design. It was emphasised that this should be both explanatory and predictive 'in action', and that landscape architecture theory is most useful if it is 'situated'.

Design thinking was compared and contrasted with research thinking and the gap problem was conceptualised in terms of the designer's 'blunt pencil' on the one hand, and a problem of the 'fuzzy logic' of research, on the other. In the former case this refers to the design approach which is failing to accurately portray the human condition, with over generalisation of user needs requirements, which results in a loss of meaning when 'reality' becomes disembodied from 'image' and is represented using words.

The need to define 'environmental quality' was highlighted as a key requirement for theory to be useful. The limited utility and relevance of criteria, as established in the literature, for incorporating environmental quality in landscape design, was highlighted.

In addressing the question of 'how' to design with the user in mind, it was suggested that behavioural science provides the means for conceptualising the user as 'human animal', and it was acknowledged that behavioural theory for use in design exists, but it needs further interpretation if it is to be useful in the landscape design process. In exploring the applicability of basic environment-behaviour methods to landscape design, it was suggested that the systematic approach to observation was not relevant to the design process, but rather selective observation was more useful. Its ability to infuse spatial thinking with behavioural analysis was highlighted in the terms that Lynch first described, that is, by conceptualising space in terms of a setting that helps or hinders the user in accomplishing his/her intended task. In addition, and as also highlighted by Lynch, the application of such thinking in the design process is most effective if applied creatively, using specially adapted techniques for *spatial* analysis.

It was suggested that the landscape architect needs 'interpretive/predictive' tools to help 'know more in order to understand'. For providing a new way of interpreting a spatial setting from the user's perspective, towards generating understanding of user needs, the utility of the interface concept in combination with 'natural mapping' and the path concept, were suggested for introducing an objective 'lens' to the visual-spatial approach. Furthermore, it was suggested that the behaviour setting concept, when integrated with the spatial sequence approach was potentially especially useful for 'mapping' behaviour from a spatial/behavioural perspective, and for introducing 'evaluation in action' to the design process. The potential application of the behaviour setting theory and its embodiment in spatial sequence analysis (whether using Lynch's sequential form, or Cullen's spatial sequence technique) for integrated spatial/behavioural analysis, suggests an interpretive/predictive tool in the making.

Conclusion

The practical application of the behaviour setting concept when embodied in spatial analysis merits further exploration. The utility of such a tool should be examined for its ability to facilitate a user-centred approach to landscape design, as a dynamic 'mapping' tool, and its interpretive/predictive ability to help the designer 'know more in order to understand'.

This concludes the end of the theoretical section. The next part of the thesis focusses on application and methods. The section will be structured as follows: firstly chapter 6 explores the applicability of behavioural theory when embodied in spatial analysis; chapter 7 reviews ways of introducing predictive thinking to design; chapter 8 explores the application of research methodology and its relevance to design; chapter 9 describes a site survey method for introducing 'evaluation-in-action'; and finally, chapter 10 concludes with a summary discussion and some suggestions for future work.

PART TWO: APPLICATION

"The real voyage of discovery consists not in seeking new landscapes but in having new eyes."¹

¹ PROUST, Marcel in: BARRY, Anne Marie Seward, Visual Intelligence. Perception, Image and Manipulation in Visual Communication. State University of New York Press, Albany, USA, 1997

Chapter 6:

A TOOL IN THE MAKING

"...there are many economic, technical and aesthetic considerations, that shape the buildings we know; they in turn shape the behaviour patterns of people who use them. To reverse this relationship, to start from an understanding of human motivation and let this concern shape the form, will require a profound alteration in the basic approach to design."¹

6.1 INTRODUCTION

This chapter explores the application of behaviour setting theory when embodied in spatial analysis. The application of the theory is explored in research and design-oriented studies, with particular consideration given to its practical implementation, and its interpretive/predictive capabilities.

6.2 APPLICABILITY ISSUES

Generally, designers have to face the question of 'design what for whom?'² The forest wayfinding site study examples illustrated in the previous chapters presented ways of reducing the scope of user needs to focus analysis on a particular type of landscape experience, in a specific and situated way. The use of selective observation was identified as being more appropriate to design than the comprehensive, systematic approach to observation based studies, for providing a way of conceptualising and bringing into perception (and thus enabling the designer to deal with) the 'spatial-behavioural' properties of space.

The potential of the theory

In the research sphere, social science researchers have just begun to realise the value of the behaviour-setting survey for its ability to synthesise with other qualitative research methodologies.³ Researchers have recognised that, since Barker's day, there have been

¹ DEASY, C M, *Design for Human Affairs* (1974), paraphrased in COOPER MARCUS Clare, and FRANCIS, Carolyn (eds), *People Places*, 2nd Ed, John Wiley & Sons, Inc, USA and Canada, 1998, page viii

² CARR, Stephen, FRANCIS, Mark, RIVLIN, Leanne G, STONE, Andrew M, *Public Space*. Cambridge University Press, Cambridge, New York, and Victoria, Australia, 1992

³ GEORGIU, Doris, CARSPACKEN, Phil F, WILLEM, Edwin P, "An expansion of Roger Barker's Behaviour Setting Survey for an ethno-ecological approach to person-environment interactions", *Journal of Environmental Psychology*, Vol. 16, no 4, December 1996, pp 319-333

many advances in the human sciences and that the concept needs to be re-applied in order to ‘sharpen’ and enrich Barker’s original ideas.

This thesis suggests that for an integrated spatial-behavioural approach to design, the uncovering of *spatial*-behaviour settings is necessary because these comprise basic units of analysis which the landscape architect can deal with. The challenge is to identify, explain and describe behavioural units with spatial attributes using observation based study in a way which does not attempt to systematically record all that is happening in a place. This must be an approach by which thinking oscillates between two-, three- and four-dimensions and between macro and micro scales of thinking, in a hierarchical thinking structure that fits with the spatial structure of the landscape itself, which is both regional and local, and takes consideration of its background spatial structure and detailed content, *at the same time*. Lynch suggested that for enriching the Behaviour Setting concept for its application in design, the theory should be considered in combination with Perin’s behaviour circuit theory. This thesis considers Perin’s theory to have a facilitating and reconciling role (as already suggested in chapters 3 and 4) and therefore this provides a starting point for sharpening a designer’s thinking ‘with the user in mind’, using the behaviour setting concept.

The behaviour circuit concept

Perin stated some thirty years ago that the gap in behavioural/design knowledge will remain as long as the designer has license to construct his/her *own* reasons for providing a solution type. With reference to Alexander’s approach at the time of writing, Perin states that the designer will adopt this, or any other approach, which provides design ‘prototypes’ as ready made solutions that are in the designer’s ‘store of knowledge’, until a new way of conceptualising user needs that *fits* with what the *designer needs*, is found. At the same time she stressed the need to add substance to the creative act.

Perin stated that in order to satisfy the designer’s need for data in a usable form for design, there needs to be a way of reducing ‘what people want’ into nonverbal, 3-dimensional forms. By not separately collecting quantitative data about attitudes, opinions, values and preferences, but instead by seeing them embodied in what people do and expect to do, Perin suggest we might then begin to understand people in terms having direct meaning in three dimensions and to begin to address the designer’s need. The concept of ‘role’ is key to this.

To uncover a person's role (the user's), Perin proposes the use of the 'behaviour circuit' in combination with the behaviour setting, which collectively provide the conceptual tools needed to design 'with man in mind'.

The behaviour circuit concept explained

This thesis highlights the utility of behaviour circuitry in design for analysing space in terms of *how it actually is* (using environment-behaviour observation), as well as *how it might be* (using role-play). It was suggested earlier that for the latter approach, task-based analysis of the type described by the behaviour circuit, in combination with the 'path' concept, is particularly useful. For design purposes it would most usefully be applied as a means of testing out design ideas either through 'self' - by mentally and bodily 'simulating' a walk-through, or drive-through, experience of a place - as well as observing others carrying out tasks in similar settings to that which a landscape architect may currently be designing.

The concept of 'role' and its application in behaviour circuit theory, distinguishes between 'the role of the pedestrian', for example, as somebody walking, and what the pedestrian is actually *doing*. The behaviour circuit/task-based analysis approach provides a way of decomposing, or breaking down, into chunks the sequence of smaller actions that we enact in the process of 'going shopping', or 'finding a forest park', for example. The behaviour circuit, as with the behaviour setting, is a concept, a theory and a tool, in one but, critically, the behaviour circuit borrows from others techniques for putting theory into action.

Perin's theory came about on realising the need for a whole new system of conceptualising environmental design when taking into account a user's movement through physical space. She recognised the need for a technique for describing the entire activity sequence. Earlier in chapter 3, Philip Thiel's Sequence-Experience Notation for Architectural and Urban Spaces had provided a suggested technique for visualising in such a sequence the many smaller actions required within the simple act of going shopping. Other suitable techniques such as Christopher Millard's evaluative approach and Halprin's 'movement notation'⁴ (as illustrated below in figures 6.2.i and ii) were also suggested by Perin for having application.

⁴ HALPRIN L., *The RSVP Cycles. Creative Processes in the Human Environment*, George Braziller Inc, New York, 1969,

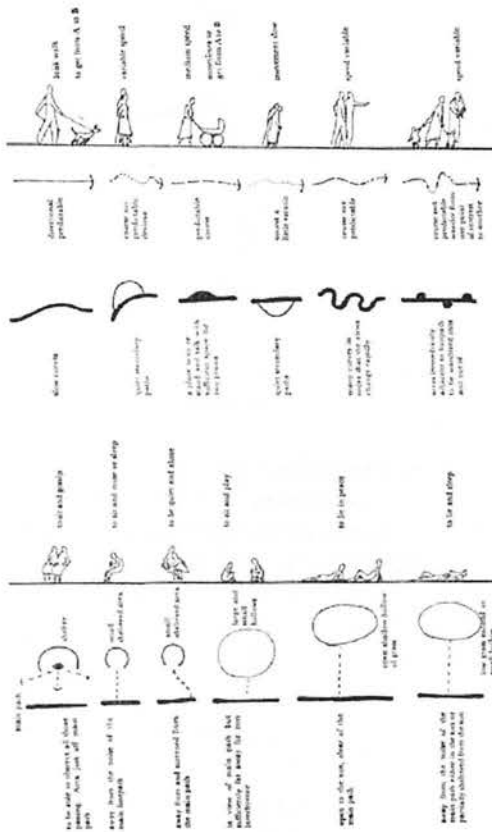


Figure 6.2.i: Christopher Millard's notation method for pedestrian analysis. (PERIN, C, 1970, pp 94-95)

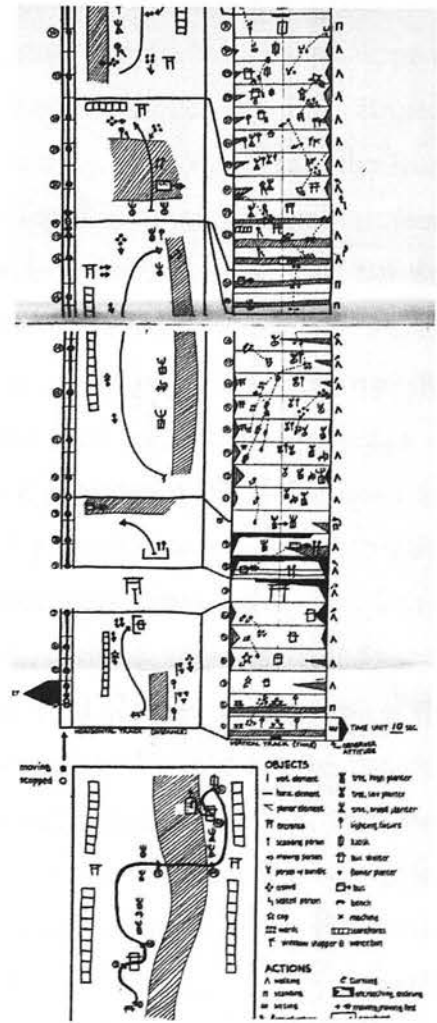


Figure 6.2.ii: Halprin's 'motation' study (HALPRIN, L, 1969, p 68)

Perin noted however that some of the more artistic approaches such as Halprin's musical score ('motation' study) which used the musical concept to introduce movement and environment-behaviour into the creative process of design, do not adequately incorporate the concept of *purpose* into their analysis. Furthermore, it is notable that Millard's method appears to abstract the pedestrian analysis from its spatial context.

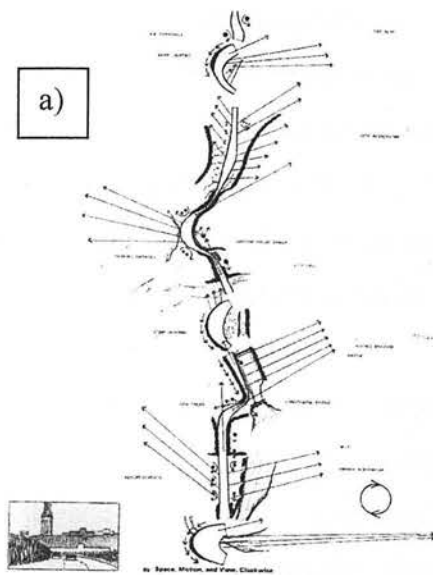
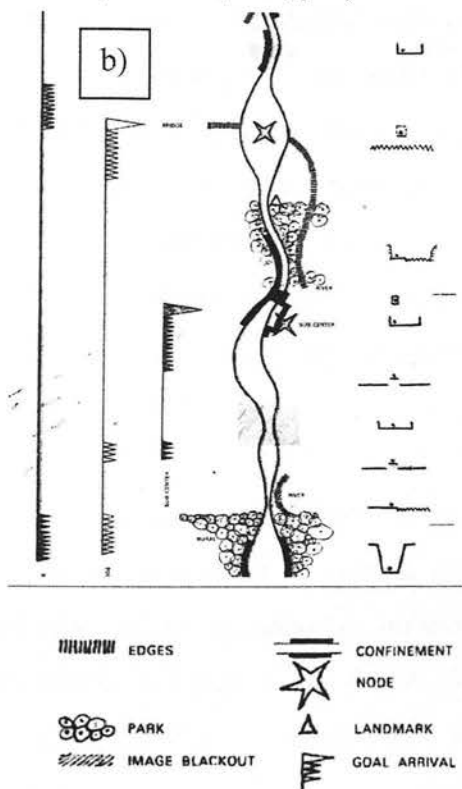


Figure 6.2.iii: Capturing 'sequential form' using VFR notation: a space/motion diagram (a) and a hypothetical design along a river system (b) (APPLEYARD, LYNCH, & MYER, 1964, p 39)



Perin suggested the behaviour circuit is most effective when used in conjunction with other more evaluative approaches. Lynch appears to be a key developer in this respect. Appleyard and Lynch's View from the Road study⁵ developed a form of notation more oriented towards the design approach but was evaluative at the same time. These researchers attempted to develop a new language for design which incorporated the *aesthetics* of the landscape experience. The View from the Road ('VFR') notation was intended to elicit simple perception data that landscape architects and highway engineers could use to improve the road journey by improving the 'message of the trip'.⁶ Although the notation was developed when analysing the road experience, in their seminal book, Appleyard and Lynch present the method as having application in other settings and, significantly, alternately in 2-dimensional diagrammatic form, or 3-dimensional image sequences for capturing movement through space in 4-dimensions. Using such space/motion diagrams and images Lynch/Appleyard were able to "consider and organise the structure of the moving view, while leaving open the questions of detailed form and character".⁷

The hypothetical design along a river system illustrated in figure 6.2.iii (b) highlights an imaginary approach for "fitting a detailed pattern of topography" and the demands of

⁵ APPLEYARD, D, LYNCH, K, MYER, J R, *The View from the Road*, MIT Press, USA 1964

⁶ GOODEY, B, "Perception of the environment: An introduction to the literature." Occasional Paper no 17, Centre for Urban and Regional Studies, UK, 1973

⁷ op cit, APPLEYARD, D, LYNCH, K, MYER, J R, 1964, p 39

circulation using the diagrams as “a convenient means of expressing and designing that experience.”⁸ The potential of the system may only become fully realised when used in conjunction with 3-dimensional images such as provided by the photo/sketch sequence provided in **plate 6.2**. This hypothetical design study provides a visual-spatial walk through of the landscape experience when trying to follow the Braidburn River in Edinburgh from its source down to the sea.

Spatial sequence analysis was applied in the Braidburn study to work through design possibilities in a bodily way, using the ‘self’ to explore the landscape experience, by breaking down the route experience into ‘chunks’ of environmental information. Along the river, these were spatially defined by a certain type of landscape experience, for example a woodland/river experience, which changed into an open park-like experience, through pockets of suburbia, through more woodland/river, more built environment, and finally, the seaside. These appeared to be demarcated into their ‘chunks’ of experience by ‘thresholds’ of experience which occur where the user must come away from the water to cross roads or bridges and find a way to re-connect with the water. In this way experiential ‘units’ for analysis emerge which are nested in a wider ‘region’ setting of the linear strip occupied by the Braidburn stream.

Another technique Lynch provides for translating behaviour circuitory into usable ‘chunks’ of environmental information, is illustrated in figure 6.2.iv in the form of a ‘composite sketch sequence’. The tool illustrates its utility in research for contextualising interview survey data, through which a respondent could show how and when he carries out a behaviour circuit.

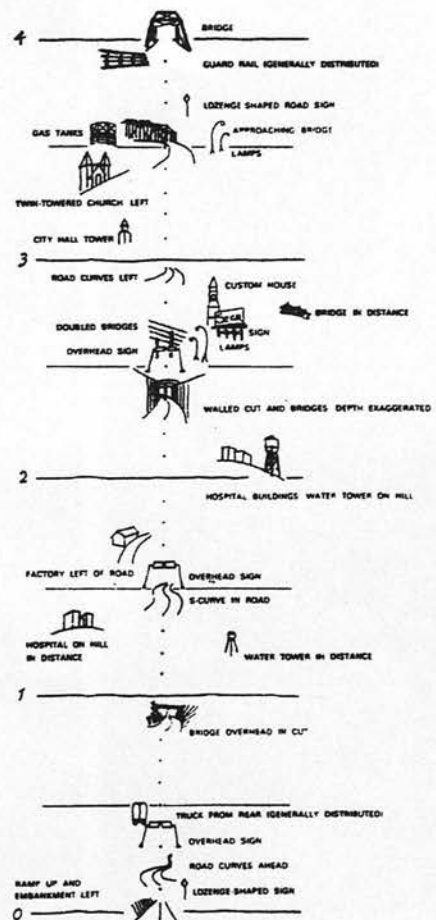


Figure 6. 2.iv - A composite sketch sequence

⁸ op cit, APPLEYARD, D, LYNCH, K, MYER, J R, 1964, p 39



Plate no 6.2 – A hypothetical design study – a visual-spatial walk through of the Braidburn Riverside – from the source to the sea -

In Lynch's composite sketch sequence, the most often mentioned 'landmarks' in a survey of users' driving experience were 'reconstructed' in integrated interview/sketch form. Notably, this is at a completely different scale to the shopping behaviour circuit illustrated earlier in list form. This example is also a coarser 'grain' in contrast to the shopping circuit which is a 'fine grain' setting. However, application of the *concept* is the same since, as we are told by Edward Hall⁹, when we are in a car our legs become wheels and our cars a projection of the human body – this is the nature of the human's 'hidden dimension'. It is notable that Perin suggests that with enough research a 'typology of behaviour circuits' could be determined where similar types of behaviour circuits occurring in similar environment settings are identified.

Perin, Sancar and others have recognised that in order for user-needs to be incorporated into the design process, they need to be conceptualised in 3-dimensional spatial forms. Furthermore, Lynch suggested that the practitioner needs methods that are simple and rapid enough to use 'while designing and under the pressure of decision'¹⁰, emphasising the primary equipment the practitioner has - the human eye and ear. However, towards gaining 'a new kind of knowing' which integrates spatial and behavioural thinking in design, the steps one needs to take to conduct such an approach have to be identified, in order to be able to infuse the parts together. In other words designers need to know 'how'. A set of principles and procedures based on an approach suggested by Perin will now be analysed for its utility and relevance to *landscape* design.

6.3 IDENTIFYING PRINCIPLES AND PROCEDURES FOR INTEGRATED SPATIAL-BEHAVIOUR ANALYSIS

A core principle for an experiential approach to landscape design using *integrated* spatial-behaviour analysis must be that the behaviour setting is viewed as a building block for the behaviour circuit, and therefore the core unit of analysis. It is notable that the behaviour setting 'discovery' initially shifted thinking in the behavioural sciences towards thinking about behaviour in relation to the physical environment and pioneered new approaches to behavioural research in the 1960s/70s. Significantly, it was out of this shift in thinking that Canter's 'Theory of Place'¹¹ emerged, which this thesis has also

⁹ HALL, Edward, T, *The Hidden Dimension. Man's Use of Space in Public and Private.* The Bodley Head Ltd, London, 1966.

¹⁰ LYNCH, Kevin, *Managing the Sense of a Region.* The MIT Press, Massachusetts, USA, 1976

¹¹ CANTER, D, *The psychology of place.* The Architectural Press, London 1977

already highlighted as being a fundamental ‘facilitator’ to a user centred approach to landscape design in the experiential paradigm. A return to first principles is called for.

6.3.1 Return to first principles– a review of the original behaviour setting concept

Canter conceptualises ‘place’ as an holistic unit in which the three constituents are interrelated. Using this approach suggests that places are viewed as units of activities, where physical form both *facilitates* and symbolises the interactions which take place in it, and the activities and meaning attached to the place are shaped by both the physical form and the goals and purposes of individuals. Behaviour setting theory provides a basic unit for analysis within this transactionalist perspective.

Behaviour setting theory states there is an essential fittingness between human behaviour and environment occurring in a bounded unit. Furthermore, it is of a dynamic nature because it is both behavioural and physical.

The significant breakthrough that Barker contributed was the realisation that the boundaries of the behaviour–setting unit were self-generated by a person’s unbroken ‘behaviour stream’, that is, one in which there is interdependence between behaviour and the environment. Designer-researchers subsequently realised that the concept could become integrated with the form-giving process of design (spatial analysis).

The first mention of the behaviour setting concept in the sphere of landscape design was made in ‘Landscape Architecture’ journal in 1971. An article appeared by Paul V Gump entitled “The Behavior Setting: A Promising Unit for Environmental Designers”, stating that:

“People live out their lives in a sequence of environmental units. What they do in these units and what is done to them, is life”.¹²

Gump suggested that the ‘discovery’ of the behaviour setting provides a new way of dividing the environment into units, and an improvement on methods previously used which he stated had been ‘primitive, vague and inconsistent’.¹³ Just prior to this publication, Perin’s book had appeared. Here, Perin too stated that designers needed

¹² GUMP, Paul V, “The Behavior Setting: A Promising Unit for Environmental Designers”, *Landscape Architecture*, January 1971,

p 130
¹³ *ibid*

the 'behaviour-setting' as a key unit for analysis in order to design 'with man in mind'. In the architectural sphere David Haviland had described the concept in 1967 in terms of 'activity space'¹⁴, and Bechtel incorporated it into his book on environment-behaviour methods¹⁵, as did Zeisel, in his 'Inquiry by Design'¹⁶ as a concept central to environment-behaviour observation. Finally, Lynch introduced the behaviour setting concept in 1976 in his publication 'Managing the Sense of a Region', where he suggested that Barker's concept together with Perin's behaviour circuit, were the most useful way of analysing an inhabited area.

Later Lynch and Hack¹⁷ reiterated the usefulness of the behaviour setting, suggesting that any environment can be divided into an array of those spatial and temporal units, which can be identified and distinguished by regular procedures. However, Lynch/Hack concede that the designer may be unwilling to conduct such a thorough analysis, and so it is suggested the designer contents himself with recording the stream of activity in some limited space of particular interest to him such as a street, or a park.

In his 'Site Planning' publication¹⁸ Lynch dedicates a whole chapter to 'the user'. He states that "making places that fit human purposes is the task of site planning."¹⁹ The importance of spatial and temporal legibility is emphasised. Lynch asks 'Is there space to carry out that action? Is the site equipped and managed for it? Does the setting reinforce its mood and structure?' In other words, "are the behavioural settings adequate for their purpose and free from internal conflict?"²⁰ What Lynch was referring to in evolutionary psychology terms is *affordance* – but not so much in terms of 'what's in it for me' but rather, more towards a way of thinking in terms of 'are the conditions conducive to a certain activity to take place?'.

Together with its twin concept the behaviour circuit, the use of a type of graphic notation is suggested by Lynch/Hack, to look at the bounded unit of action and place

¹⁴ LANG, Jon, Creating Architectural Theory. The Role of the Behavioural Sciences in Environmental Design. Van Nostrand Reinhold, USA, 1987

¹⁵ BECHTEL, Robert B, Robert W MARANS, and William MICHELSON, eds, Methods in environmental and behavioral research. Van Nostrand Reinhold, New York, 1987

¹⁶ ZEISEL, John, Inquiry by Design. Tools for Environment-Behavior Research. Wadsworth, Cambridge University Press, 1984, UK, USA, Australia.

¹⁷ LYNCH, Kevin & HACK, Gary, Site Planning. The MIT Press, USA, 1984, 3rd Ed

¹⁸ *ibid*

¹⁹ *ibid*, p 67

²⁰ *ibid*, p 74

(the behaviour setting) and the track of activity followed by an individual over a cycle of time (the behaviour circuit) - see figure 6.3.1.i.

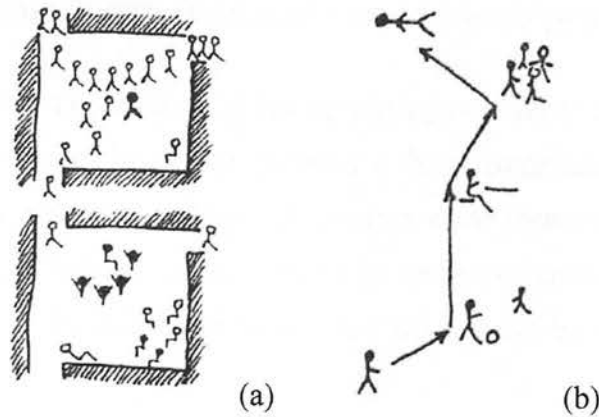


Figure 6.3.1.i - An illustration of the use of the behaviour setting (a) and behaviour circuit (b) for environmental design purposes. (LYNCH, Kevin, HACK, Gary 1984, pp 86-87)

The problem is, when the behaviour setting/circuit concepts are translated for use in design in the way presented by Lynch/Hack, a crucial aspect of the concept appears to become lost: if the space to be analysed is defined by physical attributes alone from the outset eg 'the park', 'the street', this does not encourage the designer to allow the pattern of interactivity between people and physical space to reveal *its* boundaries to the observing designer. When a prevailing pattern of human activity reveals its own boundaries to the designer/researcher, such spaces may still be termed 'the street', 'the park' and so on, but its 'spatial/behavioural' boundaries can be quite different to its physical boundaries.

This thesis suggests that the original meaning behind the behaviour-setting concept has become lost because its translation across from the research sphere into design is crude and over-simplistic. The opportunity for implanting a view of the landscape from the user's perspective, (that is, a 'side-view' of the landscape experience), is not fully achieved. Significantly, the role of the behaviour setting concept as a key to shifting thinking towards an integrated spatial-behavioural approach to landscape analysis, is not emphasised. This thesis suggests a set of suitable information gathering and processing techniques need to be explicitly explained for application in design. To this effect, existing techniques are briefly summarised, followed by an exploration of ways of explaining their application and adapting them towards capturing a 'side view' of the landscape experience.

Firstly, the problem of defining what a behaviour-setting actually is, must be addressed.

Defining the behaviour setting concept – problems and potentials

One needs to be able to identify a behaviour setting in order to define it. For this, the original theory presented by Barker provides a fairly complicated set of criteria for what constitutes a behaviour setting and employs some technical terminology would appear baffling to a designer. These should be reviewed however, to understand the original *meaning* of the behaviour setting and how it can be interpreted for use in design.

On describing the discarding of non-settings Barker states:

"First it must pass the structure test: it must be a behavior-milieu synomorph, ie (a) a standing pattern of behavior (a bounded pattern in the behavior of men en masse which occurs independently of the particular persons involved), (b) anchored to a particular milieu complex, (c) at a particular time-space loci, (d) with behavior and milieu synomorphic, (e) and with milieu circumjacent to behavior."²¹

The words i) 'standing pattern', ii) 'milieu', iii) 'synomorphy' and iv) 'circumjacent' are key words in its original description:

- i) The *standing pattern* relates to the overall, prevailing pattern of behaviour en masse, for example pedestrians walking up and down a street. This is its main structural element.
- ii) The *milieu* of a behaviour setting exists independently of the standing pattern of behaviour and, according to Barker, people's perception of the setting: the milieu is best illustrated by Lang's visualisation of the basic interaction occurring in a subsetting of 'the shop' behaviour setting in figure 6.3.1.ii below. This is effectively the 'interface' between the user (the shopper) and the setting (the shop).

²¹ BARKER, Roger, *Ecological Psychology – Concepts and Methods for studying the Environments of Human Behaviour*. Stanford University Press, USA, 1968, pp 37-38

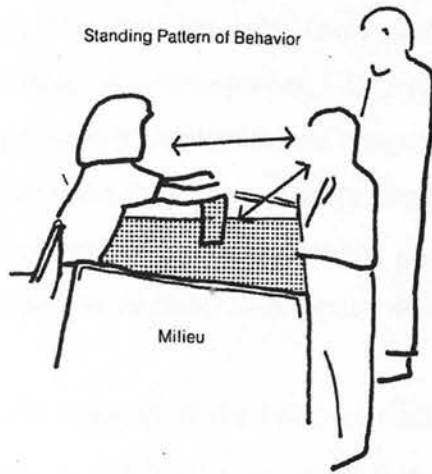


Figure 6.3.1.ii: -The milieu and its independence from the standing pattern. (LANG, Jon, 1987, p 115)

This recalls to mind Norman's interface concept derives from ergonomics where it is closely linked to the behaviour setting concept. Its use today is representative of a shift in thinking that occurred in those areas of design where there is a focus on how people interact with machines. The idea is that the interface concept helps make *visible* where a design might be going wrong. Thus, this helps focus attention on the key aspects of the environment with which the user will be interacting in order to accomplish certain tasks/activities, and thus establish a 'discernible relationship between actions and an end result'.²² When applied as a conceptual model for design, according to the theory, the interface concept should allow a degree of predictability concerning design decisions.

iii) The attribute *synomorphic* means similar in structure. It describes an essential feature of the relationship between the behaviour and the milieu of a behaviour setting. There is high similarity between the boundary of the behaviour and milieu itself, such as the boundary of a football field and boundary of the game, or in the above example the boundary of the activity of 'purchasing' some goods at the check-out counter, and the counter itself, together with the goods being purchased. Thus, not only is there synomorphy between the boundary of the behaviour, but the synomorphy of the behaviour and the milieu extends to the fine, interior structure of a behaviour setting. In landscape architectural terms, this might be considered as the interactivity of people with the 'content' of a place (its 'interior') whilst the place itself provides the boundaries of the behaviour setting.

²² NORMAN, D, The Design of Everyday Things, MIT Press, USA 1998, p 40-41

iv) The final key term that is central to understanding the meaning of the behaviour setting, is *circumjacent*. This refers to the encompassing nature of the milieu of a setting which provides its temporal and physical boundaries. The significant point is that these may or may not be tangible, physical boundaries: it is here that the landscape architect is likely to encounter great difficulty since to identify such boundaries entails a shift in thinking about space itself.

The problem of the behaviour setting concept is that it is a complex concept to grasp but on the other hand when it is simplified for design such as Lynch/Hack provided, (that is when its 'words' are translated into 'images'), the subtleties are easily lost. This thesis suggests that landscape ecology provides a useful language for design, not least because it is one that is already in use in landscape architecture. The use of the language can be readily adapted for explaining the core principles of integrated *spatial-behaviour setting* theory which is, after all, founded in *ecological* psychology.

The behaviour setting – an ecological unit for analysis

Multiple behaviour-settings exist within an overall hierarchical structure ranging in scale from 'macro' behaviour settings at the top to 'micro' settings at the bottom, which are either nested within, or overlap with, each other. The grain concept is particularly helpful to understanding the regional/local structure of behaviour settings.

A fine grain *spatial-behaviour* circuit has mostly small patches (or sequence of *spatial-behaviour* settings) – such as demonstrated in the 'going shopping' example where quite small localised tasks took place (eg crossing the road), whilst a coarse grain landscape in *spatial-behavioural* thinking has mainly fewer, larger patches and this, together with the hierarchy concept, can be illustrated in the forest wayfinding example, as follows. Here, the basic behaviour setting concept was used to generate a 'system image' of the forest wayfinding experience.

6.3.2 Using behaviour setting theory to generate a 'system image' model for assessing wayfinding needs in the countryside setting.

In the forest wayfinding study, for the purposes of this thesis, a model was sought which could serve three purposes: that accurately captured, explained and described the generic wayfinding experience; that could provide a means of narrowing the scope of,

and organising, the information gathering process (for recording, processing and analysing); that provided a logical wayfinding structure that related to the physical landscape that could ultimately be used to design, plan, manage and evaluate signage for forest recreation purposes.

According to Passini, getting wayfinding right in design involves an ability to imagine the whole experience in its entirety. This is because as an activity, wayfinding is one like few others that demands a complete involvement with the environment. To understand wayfinding in design and planning, Passini suggests a conceptualisation of the process in terms of a decision making hierarchy (figure 6.3.2.i).

During visitor interviews conducted during phase I of the wayfinding study (the scoping exercise) people would often state that they had had 'no problems' finding a site but when probed further (by encouraging visitors to describe in detail the sequence of events that structured their route experience to site), people would often later admit that in fact there was a problem but it was only on one or more aspect/s of the journey. Also, some basic observation analysis revealed that certain problems were arising that were not coming out in the interviews, because the researchers were asking the wrong questions. For example, 'did you have any trouble finding the site' appeared to put visitors on the defence as if their basic capability as a human being were in question or, on the other extreme, users will blame themselves rather than look for a cause other than their own human error. Psychologists recognise this as a common phenomenon:

"Because everyone perceives the fault to be his or her own, nobody wants to admit to having trouble. This creates a conspiracy of silence, maintaining the feelings of guilt and helplessness among users."²³

When visitors' problems were considered in terms of a hierarchy of wayfinding needs/expectations that coincided with the spatial structure of the landscape, and when all the interview data and observation based environment-behaviour and visual analysis were considered jointly, it was found that the problem areas broadly fell into four aspects of the journey, or 'categories of need', that occurred in sequential order with each problem area interlinked with the whole wayfinding experience, as structured by the physical form of the landscape and its 'content'.

²³ op cit, NORMAN, D, 1998, p 40-41

The four categories of need were conceptualised as hierarchical units at different levels of the wayfinding experience, in much the same way as Passini illustrates his 'plan' model illustrated below in figure 6.3.2.i (a). In the forest wayfinding study, the four levels of wayfinding were initially named as: level I 'expectating/anticipating'; level II 'approaching/finding'; level III 'arriving/finding' and level IV 'arrived/found/finding'. The 'static model' conceptualised by Passini exists in conjunction with the dynamic 'side-view' aspect of wayfinding illustrated alongside in figure 6.3.2.i (b) below. The figure (a) illustrates the decision making process in the spatial context, where decision plans exist within the larger context; and (b) illustrates the process in its temporal context. Here, decision plans break down into a sequence of tasks and sub-tasks that translate into behavioural actions as the user moves through the landscape (in this example Passini uses the scenario of sailing the South Seas).

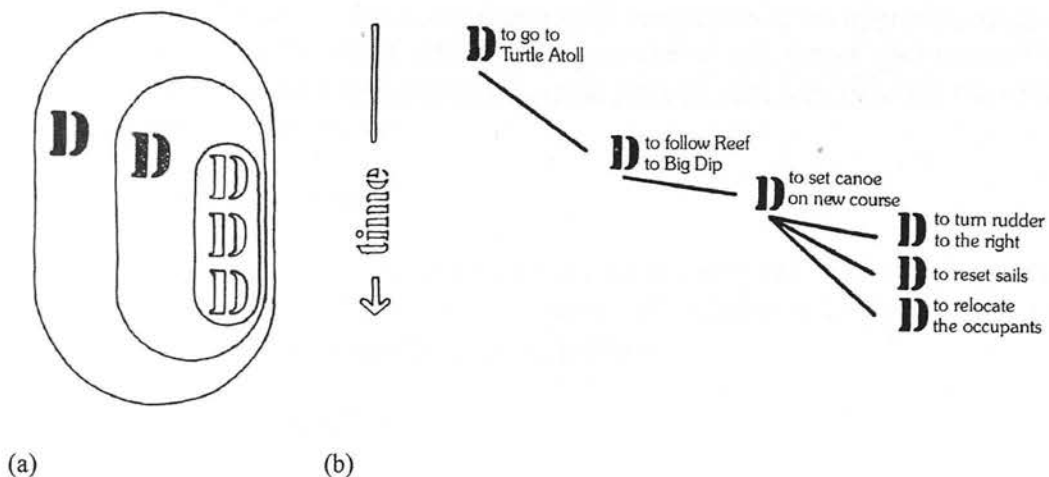


Figure 6.3.2.i – Passini's conceptualisation of wayfinding as a decision hierarchy. (PASSINI, R, 1992, p 64 and p 68).

The categories of need in the forest wayfinding study were related to the wayfinding decision making process towards identifying 'decision spaces'. These were considered the 'units' for analysis that had physical structure, but were determined by people's behaviour. It is necessary to reinforce the point that behaviour-setting units are not imposed by the researcher, but are exposed to the researcher through his/her observations of humans interacting with their environment in a non-deterministic approach. The research intervention, and indeed the innovation, is in the way these interactions are conceptualised and categorised by the researcher (or designer) into hierarchical units of the type described above. In this way, 'the landscape' can be brought into perception (from a spatial-behavioural perspective) *before* it is dealt with.

The 'static' model of the forest wayfinding system (in terms of four levels) had originally started as a loose framework but became refined throughout the phases of the study as the researchers built up a more comprehensive 'system image' of the wayfinding experience, through interview surveys contextualised by integrated spatial-behaviour analysis across a variety of sites. Although each site was unique in its spatial setting and the type of wayfinding experience it provided, there emerged a similar pattern of categories of wayfinding problems across all sites. The result was a four stage evaluation model which enmeshed the wayfinding decision-making process into the background spatial structure of the landscape. In the context of the current discussion these are discrete *spatial*-behaviour settings within the holistic unit of the *spatial*-behaviour circuit that arose out of the following set of 'problems':

I 'Expecting/Anticipating'

With reference to the initial decision to visit/deciding on approach route, it was found that conflicting information provided at the outset (pre-arrival) caused confusion about route choice and about what to look out for along the route, and on approaching the site;

II 'Approaching/Finding'

When users were trying to find the approach route, even if it was easy to find the entrance to the site, there were points of confusion along the way causing problems when finding the approach route;

III 'Arriving/Finding'

When trying to find the entrance, even if it was easy to find the approach route, the journey may still have been problematic because there was difficulty in finding the entrance;

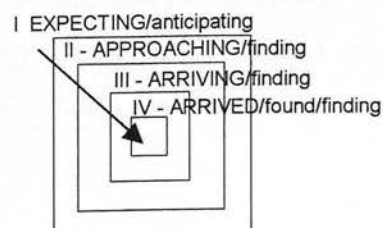
IV 'Arrived/Found/Finding'

On arrival at site, even if it was easy to find the approach route *and* find the entrance, there was often great confusion on arrival in finding out where everything is in order to satisfy immediate arrival needs.

A model of the 'system image' emerged as follows:

A a hierarchy of wayfinding decision-based needs

occurring along the route in sequence in 'levels', the journey starting from home (level I) and concluding on arrival (level IV) when the destination has been reached, but at which point a sub-set of wayfinding decision-based needs arise on arrival eg 'need to find where the walks start'.

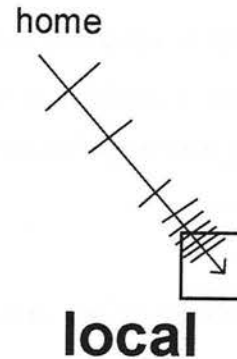


B a 'spatial hierarchy'

from regional scale setting - R E G I O N -through to the **local** setting on arrival. The closer the user gets to site the more intensified the user information needs are as the destination point is neared: the user is slowing down, taking in more detail about the environment, and as a consequence the wayfinding needs become more small scale and specific.



It is notable that in diagram B above, the cross ways lines along the arrow leading from home are intended to represent the fact that the spatial-behaviour circuit (ie, the journey) starts off a coarse grain structure at 'region' level, whereas on approaching the destination ('local') the circuitory grain becomes more fine grain, shown by the crossways lines placed closer together, as the search for detailed information becomes more intensified on trying to find the entrance, finding where to park, where the toilets are, where the walks start, and so on.



Whereas at the start of the journey, as in the example of Passini's south seas voyager, the overall picture of the landscape is general, rather than specific, the decision spaces are larger and more general. Thus, there is a loose 'static' plan of the system image such as 'go to Afan forest park via the M4 travelling east'; and then the decisions become more specific and 'dynamic' – 'M4, Junction 40, brown sign then go through two roundabouts, up valley, past big rock.'²⁴

The decision hierarchy corresponds with the spatial hierarchy since the routes form the environmental structure within which the wayfinding decisions are made. The routes *to* site, together with the layout and circulation *on* site define the wayfinding problems people will have to solve, whilst the environment and graphic communication provide the user with the information to solve the imposed problems.²⁵ These physical components when viewed through the 'viewing lens' provided by the four part model,

²⁴ derived from actual descriptions of a journey to a site, given by visitors when asked to describe their route as if to first time user.

²⁵ PASSINI, R. *Wayfinding in Architecture*. Van Nostrand Reinhold, New York, 1992

constructs the interface by which the landscape can be studied - that is, interpreted - using spatial-behaviour analysis.

Using landscape ecology terminology, the spatial-behavioural landscape is related to its overall 'mosaic' pattern that exists in a hierarchical structure. Were a study to be conducted using a systematic observation study, a healthy situation would show itself to be 'heterogenous' – or in other words, supporting many different behaviour-settings; as we know from Gehl and others, environments that provide opportunities of optional activities provide better quality environments. However, when the behaviour setting concept is applied towards structuring a study within a particular scope of user need, using selective observation, the idea is to produce, that is interpret, a 'system image' of say, wayfinding, which as the above example demonstrates, provides a simple model for making sense of a complex system.

Application of the behaviour setting concept is universal, and so its relevance to other spatial settings should be considered.

6.3.3 Towards a universal application of integrated spatial-behaviour analysis using behaviour setting theory.

In design terms, categorisation of spatial-behaviour settings should be useful for

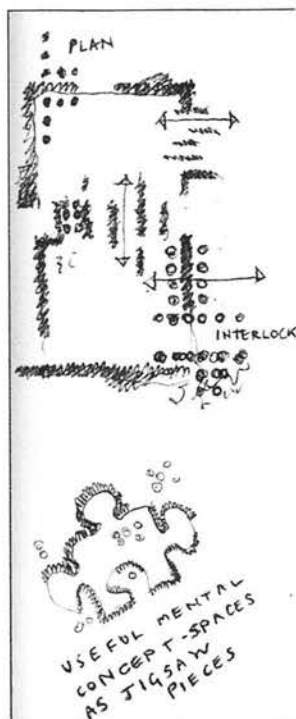


Figure 6.3.3.i – 'A useful mental concept' (DEE, Catherine, 2001, p 125).

interpreting the landscape in terms of environmental quality.

When conducting a site survey in an urban centre for example, for assessing quality of the environment for pedestrian use, in order to identify an evaluative model against which the setting may be 'tested' (in an evaluation in action approach), and using 'spending time' as a criteria for use in the open space setting, the designer might ask in the first instance 'what are the conditions conducive to spending time in this setting?'. In order to be able to identify the environmental factors that are hindering the activity, it is first necessary to identify the factors that are helping. However, in the very first instance the designer must be able to identify existing spatial-behaviour units of study.

The skill required by the designer/researcher in adopting the behaviour-setting approach is in the identification of the units, and their categorisation. In Figure 6.3.3.i Dee illustrates a useful mental concept which may be applied for the purposes of visualizing what a spatial-behavioural unit of study is – in this instance, a jigsaw piece. This may be used as a visual aid to represent a discrete spatial-behavioural unit which is bounded by human-environment patterns of activity, but whose boundaries must be brought into perception by ‘seeing’ the space in terms of patterns of spatial/behavioural interactivity, and not its spatial attributes alone.

As regards the application of the theory in the form of a dynamic mapping tool, figure 6.3.3.ii may be considered a useful mental schema for practical implementation. Lynch’s key landscape elements path/edge/landmark/node/district, in which interchangeably Dee’s foci/threshold/detail and so on can be included, collectively comprise the environmental information processor, or, as quoted earlier, organisers of ‘facts and possibilities’. The ‘typologies of use’ are the typical ‘spatial/behavioural’ settings which the designer must identify as a starting point for analysis.

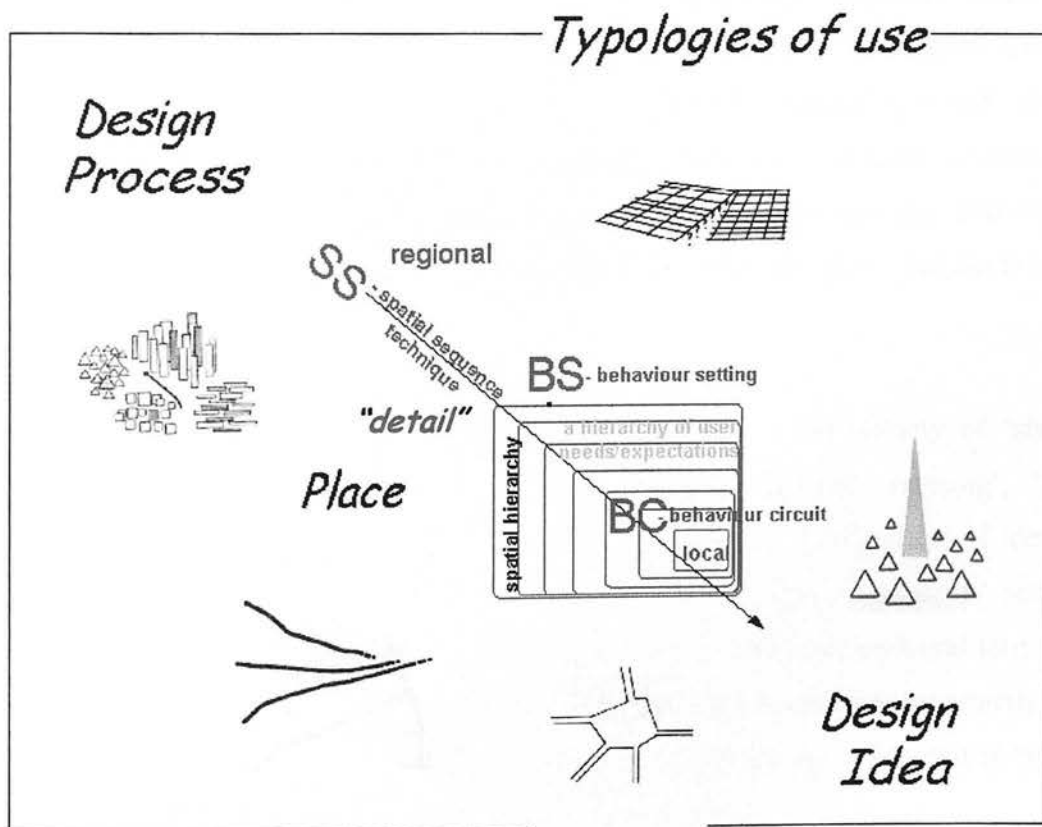


Figure 6.3.3.ii – A useful mental schema for integrated spatial-behaviour analysis using the spatial sequence technique.

It is notable in the above diagram that spatial/behaviour settings are hierarchical. In a typical British town or city, one of the settings at the top of the spatial-behaviour setting hierarchy might be 'pedestrian street activity'. This is a discernible, predominant pattern of behaviour. Subsumed within this 'macro -setting' will be a nest of smaller settings, 'shopping' or 'sightseeing'. Some streets may be characterised by one activity

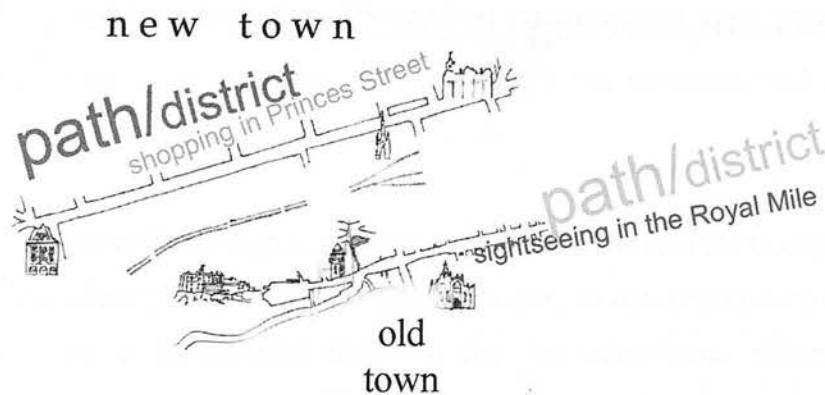


Figure 6.3.3.iii: Macro-settings of 'spatial-behaviour' in Edinburgh.

in particular, such as in Edinburgh, where its 'Princes Street' is characterised by shopping related activities, and the 'Royal Mile' is characterised by sightseeing related activities. When considered in terms of Lynch's path/ edge/ landmark/ node/ district perceptual model of the environment, settings shown in the above diagram emerge, by which 'the path' (the street) provides the physical setting (termed above as 'path/districts') whilst shopping and sightseeing are the key 'macro' activities. The challenge is to reconcile these spatial/behavioural entities as units for analysis which are not bounded by the physical street structure or behaviour alone, but the interaction of the two.

Behaviour settings are both 'nested' and overlapping. The activity of 'shopping' subsumes 'window browsing', 'bus-stop waiting', 'free-will crossing', 'platoon crossing', and so on, with much overlapping in between. The process of identifying these settings in a visual-spatial way begins by identifying a 'dominant' setting (or 'standing pattern' to use the original terminology). In spatial-behavioural terms, in the context of the British high street scene, shopping might be more appropriately termed 'street shopping' as subsumed within 'pedestrian street activity'. For spatial-behaviour analysis the objective should be to identify 'typical settings'.

The practical application of behaviour setting theory, as embodied within behaviour circuitry, is suggested by Perin in the form of a set of procedures. These will now be followed through using pilot studies conducted in the central city areas of Edinburgh and Aberdeen in Scotland, to try and elicit a way in which the theory may be universally applied in spatial analysis for (urban) landscape design.

DEPARTURE POINT FOR INTEGRATED SPATIAL-BEHAVIOUR ANALYSIS

The study will begin with a general aim to examine the environmental quality of pedestrian street spaces in city centres.

A study of Aberdeen or Edinburgh could have selected a main central street (eg 'Union Street' or 'Princes Street') as the unit of study. However, in accordance with behaviour setting theory, this is an arbitrary unit. Rather, the behavioural patterns should determine what these units are to be through observation in life, where patterns reveal themselves *to* the researcher, not the other way around.

STEP 1: Identifying a macro *spatial*-behaviour setting

To begin a site survey to analyse in the spatial-behavioural approach, an environment-setting must be identified. The 'place' concept²⁶ has been established by this thesis as the most useful background theoretical framework in which the behavioural attributes of place may be conceptualised alongside its physical and perceptual aspects. The spatial setting may be considered in terms of primary (content-related) and secondary (form related) experiential qualities but to help conceptualise place from an experiential point of view in the first instance, the concept of 'setting' is important: it helps shift the mind-set from 'spatial' to 'spatial/behavioural' thinking.

In her thesis on the use of the behaviour setting approach in the context of landscape recreation planning, Manal Abou El-Ela²⁷ suggested that the concept of 'setting' is best understood by thinking of spaces as the basic support system for particular human activities (recreation in Abou El-Ela's thesis). This essentially relates to the concept of affordance. When the idea of 'setting' is combined with 'environment', which in environment-behaviour research refers to the 'physical, administrative, and social

²⁶ op cit, CANTER, D, 1977

²⁷ ABOU EL-ELA, Manal, "The Landscape Context of Planning for Recreation. The psycho-physiological approach to the design of open spaces", PhD thesis, Landscape Architecture, Edinburgh College of Art, Heriot Watt University, 1996

attributes of settings in which people live, work and play',²⁸ the environment-setting is the spatial system which supports, or affords, a certain type (or types) of activity, and the units that structure the whole, are the behaviour settings. The concept of setting is perhaps what Meinig was alluding to when he tried to distinguish between landscape and environment:

"Landscape is not the environment. The environment is the factual aspect of a milieu: that is, of the relationship that links a society with space and with nature."²⁹

"It is landscape as environment, embracing all that we live amidst, and thus it cultivates a sensitivity to detail, to texture, color, all the nuances of visual relationships, and more, for environment engages all of our senses, the sounds and smells and ineffable feel of a place as well."³⁰

This thesis suggests a subtle shift in thinking in terms of *spatial*-behaviour settings. This would be helpful in integrated spatial-behaviour analysis, to distinguish a particular type of spatial analytical unit, for it is not appropriate in all instances to conduct landscape analysis by the spatial-behavioural approach because not all landscapes are human-occupied: it depends on the purpose and nature of the design (or research) project. In spatial-behaviour analysis there should be a deliberate intent to examine the landscape as a 'design product', that is, its performance.

In the Aberdeen example, to begin the analytical process, the 'essential spatial-behaviour character' of the central area, in relation to its street pedestrian activity, was quickly discerned to be 'street-shopping': this is the behavioural activity-type that dominates, or *characterises* the city centre because the spatial system (the streets) support, or afford, the shopping activity, and is thus deemed a macro spatial-behaviour setting. The environmental interface may be considered as occurring between the pavement, the crossing points, the shop facades, doorways and so on.

Behaviour setting theory states that in the open space context, the patterns of behaviour associated with a particular physical setting remain constant whilst individuals are changing all the time, eg high street pedestrian flow, or waiting at a bus-stop, people driving along a road looking for a forest site. Thus, the large scale patterns may be considered 'static'. These patterns continue long after individuals have moved on elsewhere, because the spatial form is relatively stable, albeit that it is subject to

²⁸ op cit, ZEISEL, John, 1984, preface

²⁹ BERQUE, Augustin, quoted in CORNER, James, (Ed), *Recovering Landscape. Essays in Contemporary Landscape Architecture*, Princeton Architectural Press, USA, 1999, p 6

³⁰ MEINIG, D W, (Ed), *The interpretation of Ordinary Landscapes. Geographical Essays*, Oxford University Press, USA, 1976, p45

temporal patterns of change over the day/week/month/season, whether from the environment itself, or from patterns of behaviour. In this way of thinking the designer/researcher should be able to define the background structural form of the *spatial-behavioural* landscape-environment in relation to its detailed contents, because there is unity overall, and diversity in its detail. This is a fundamental principle of ecology.

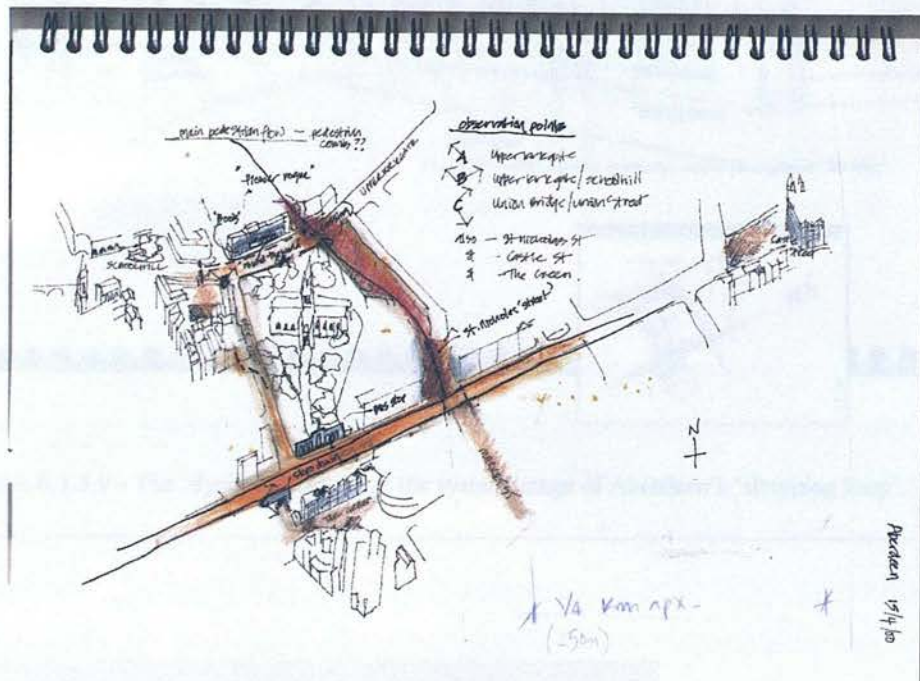


Figure 6.3.3.iv - Aberdeen's 'shopping loop'.

Figures 6.3.3.iv above and 6.3.3.v below together provide a 'static' and 'dynamic' system image of 'street shopping', respectively. The static image above, and as shown in thumbnail form in the dynamic image below (figure 6.3.3.v) illustrate a general flow of people moving between four shopping centres in an approximate square arrangement (the static model). The 'essential spatial-behaviour structure' is expressed through the use of colour. The darker orange coloured streets indicates the greatest density of 'street shopper' activity based on first impressions. This reflects the greatest density of shops located within this 'loop'. Scientific counting was not undertaken, only an *impression* of density was gained, just as when mapping for other purposes in landscape design such as an analysis of a river system, or topographical patterns. The spatial-behaviour macro-setting is named 'a shopping-loop'.

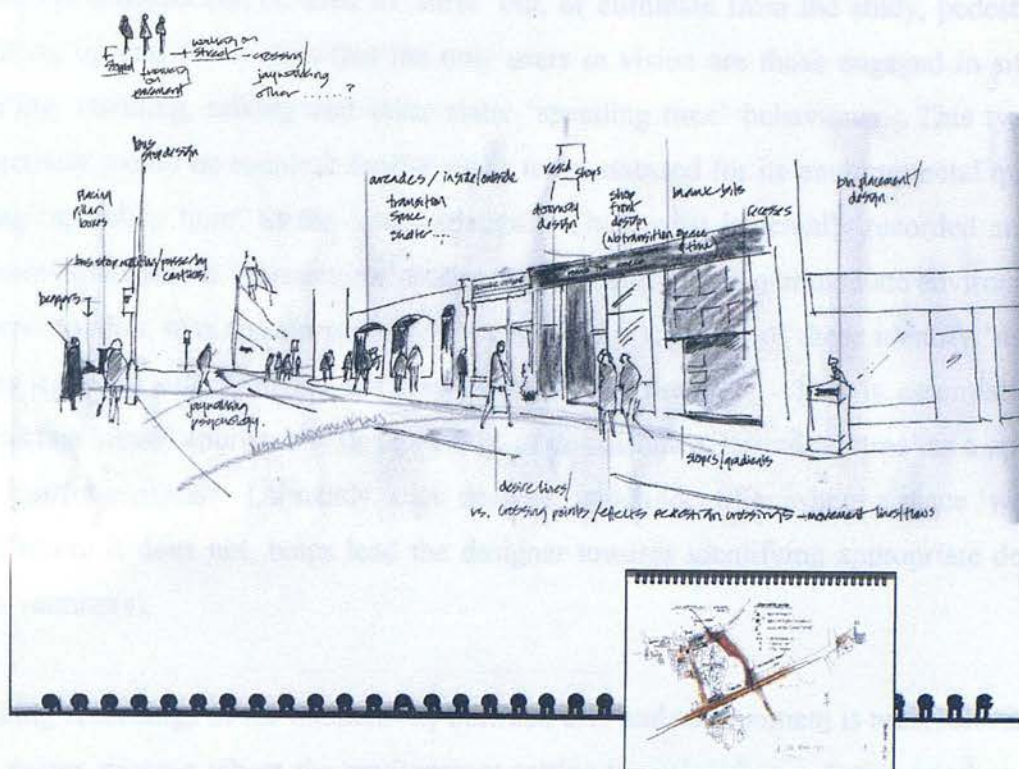


Figure 6.3.3.v - The 'dynamic' aspect of the system image of Aberdeen's 'shopping loop'.



Figure 6.3.3.vi: A coarse grain behaviour setting.

There may be a spatial-behaviour setting which arises whereby 'outsider' visitors to a city are walking along the street, stopping to take in the sights which may physically exist outside the street (for example by stopping to look,

point, and take photographs of Edinburgh Castle from Princes Street), as illustrated in figure 6.3.3.vi above; but despite the fact that this activity covers a larger area of physical space than the street itself, it would be incorporated into the overall macro-setting of 'pedestrian street activity'. This might be considered a 'coarse grain' setting.

Selective analysis can be used to ‘filter’ out, or eliminate from the study, pedestrians walking up and down such that the only users in vision are those engaged in sitting, waiting, standing, talking and other static ‘spending time’ behaviours. This type of selectivity would be required for the space to be assessed for its environmental quality using ‘spending time’ as the ‘measurement’. Thus, what is actually recorded are the human-environment ‘transactions’ that are taking place with the immediate environment (‘here’) and/or with the surrounding context (‘there’). Some of these identify ‘direct’ links eg edge effect, others are less direct, eg sightseeing. This is essentially an ‘evidence based’ approach to design using, in this instance, ‘spending time’ as a criteria for quality analysis. Ultimately, such analysis, which identifies where a place ‘works’ and where it does not, helps lead the designer towards identifying appropriate design intervention(s).

Making recordings of the interactivity between user and environment is most relevant to the design process where the environment-setting is analysed as a *design product*. As highlighted in the previous chapter using Zeisel’s illustration of the use of observations to establish relationships between an actor and ‘a significant other’ to which the physical setting in some way contributes, (chapter 5, figure 5.2.ii), such an approach does not emphasise the ‘cause and effect’ links between spatial setting and behaviour. It was suggested that Zeisel’s example appeared to emphasise the extent to which the space ‘worked’ as a *social* setting rather than a *spatial* setting, and although the two are inter-linked, the type of data produced is dependent upon what it is the designer/researcher is trying to find out and thus what he/she is trying to communicate.

The spatial-behavioural data recordings made below in figure 6.3.3.vii show sketches used in combination with a ‘speedwriting’ version of a traditional environment-behaviour notation system. There was a dual research/design purpose to this exercise: firstly, to record each spot in Edinburgh’s ‘Princes Street’ where people were engaged in some kind of ‘spending time’ activity – whether leaning, standing, waiting, sitting and so on, outwith ‘walking’ – in order to identify the correlation between seating provision and ‘spending time’ activities; secondly, from a design point of view, the study was also seeking out problems and potentials in order to explore opportunities for improving the environmental quality of the street.

Integrated spatial-behavioural analysis should take into consideration the way that landscape designers design, oscillating between the 2-dimensional plan to 3-dimension sketches, switching between different scales. Cullen's sketches opposite demonstrates this 'in action'.

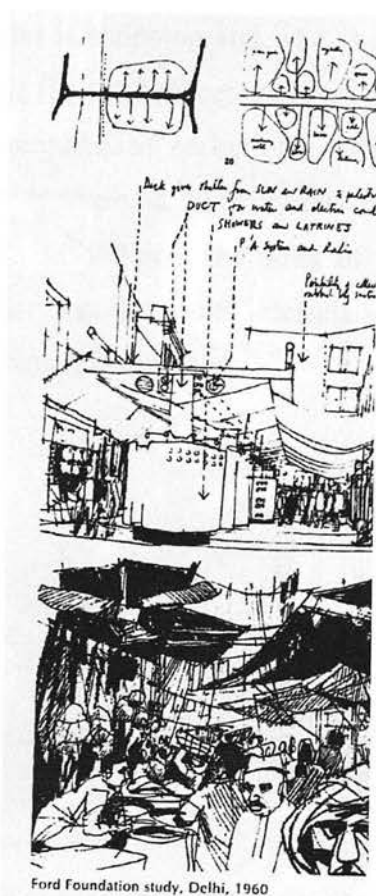


Figure 6.3.3.viii - Cullen's sketch analysis of a street scene in Delhi. (GOSLING, David, 1996, p 68)

STEP 2: Discarding non-settings

Within the overall macro-setting of 'street shopping' others may be identified nested within the overall discernible pattern of people moving about between the shops. For example 'window shopping' and 'street crossing' are specific aspects of moving between shops in which individual people may or may not be participating in terms of 'shopping', but overall these are 'street shopping' behaviours that operate with some degree of repetitiveness, 'bounded' to the environment and which collectively structure the overall pattern.

To focus a study on identifying the factors that make an environment conducive to spending time 'street shopping', the activity must be identifiable from other non-shopping activities. This is difficult by visual analysis alone, and inevitably 'grey' areas emerge. For example people standing at bus-stops are also window shoppers and

people sitting on a bench may also be shopping. However, the purpose is not to make an account of all that is going on; the approach suggested by this thesis, as derived from behaviour setting and circuit theories but adapted for use in spatial analysis for design purposes, is not to gain 'scientific' evidence of who is shopping and who is not, the point of the analysis is to identify cause and effect factors between environment and shopping, that help or hinder the activity. As emphasised earlier, the 'scientific' approach of systematic activity mapping is not appropriate outwith the selective observation approach suggested by Perin's model. In addition, the point of spatial-behaviour analysis is to emphasise the spatial rather than the social interrelationships that occur when people use a space, albeit that the two are interlinked.

By 'sifting' through the street activities, and 'discarding' non-settings, observation may be focussed on identifying if and how conducive the street is to 'street shopping', as opposed to any other activity. This calls for selective analysis. For this, 'street shopping', 'street crossing', 'standing at the bus-

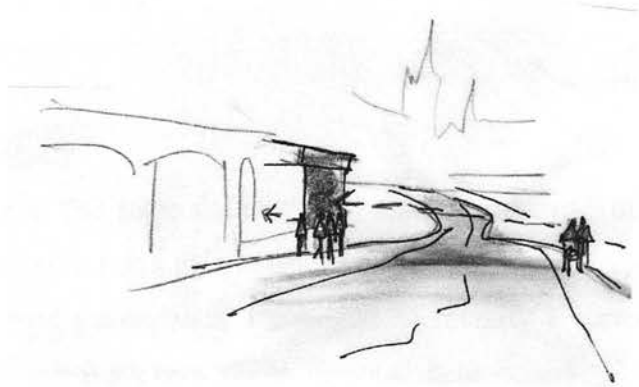


Figure 6.3.3.ix – the interrelatedness of 'jaywalking' to 'street shopping'.

stop', are distinctly separate settings that are not so much discarded, as separated out and analysed for their interrelatedness to 'street shopping'. When reconstructing the 'shopping loop' using a walk-through, a second look uncovered another layer of information. For example, jaywalking patterns revealed themselves at certain points in the shopping loop. In this street, people were free to cross the street more or less at a time and place of their choosing, and so could look at a particular shop on the other side of the street if it took their attention. Jaywalking behaviour has already been highlighted as a being indicative of a street setting that is less traffic dominated than others where 'platoon crossing' predominates; this study highlights that jaywalking behaviour can be a measure of environmental quality where its occurrence indicates a setting that is conducive to 'spending time' in the street – in this instance, in relation to shopping. Significantly, the very act of observing the interrelatedness of the two behaviours of jaywalking and window shopping, can lead to the uncovering of a spatial-behavioural unit for analysis that is not determined by the designer/researcher, but

rather, the unit reveals *itself*. Figure 6.3.3.x illustrates a particular strip of shops that seemed to be particularly engaging to passers by and thus provides a unit for analysis.



Figure 6.3.3.x - A spatial-behaviour setting – a unit for analysis.

STEP 3: Defining A Unit Of Study

In Perin's original set of procedures, at this stage she suggested recording the unit of a person's unbroken behaviour stream. Using spatial behaviour analysis this would entail the use of environment-behaviour observation based techniques to identify a certain 'typical' activity, as opposed to identifying every single persons' behaviour stream. (She uses the term behaviour stream to distinguish individual behaviour circuits from overall typical circuits). Implicit in the question *what factors create an environment conducive to street shopping*, and in the context of the identified spatial-behaviour setting, is a sub-question: *what are the detailed spatial-behavioural qualities that structure the 'shopping loop' experience?* This entails the need to describe the spatial-behaviour setting in its detail.

a) Describing the *spatial*-behaviour setting

In exploring other aspects of what makes a street conducive to shopping, looking for 'behavioural indicators' of environmental quality, along this street in this particular area, recurring points of user attraction were identified where people were looking, touching, glancing, stopping, pointing, most notably towards a cluster of three shops along the shopping loop. This led to the identification of points of attraction at one particular shop facade: there was something about this shop, its window, its siting and its display that was acting as a key attractant. Using spatial-behaviour theory, this needs to be visually 'described', using the behaviour circuit concept to break down the

typical setting into the detailed series of discrete ‘units’ of interaction that take place between human and environment.



Figure 6.3.3.xi: Using behavioural ‘indicators’ to establish criteria to establish the factors that make a street conducive to spending time browsing when ‘street shopping’.

William Whyte had suggested the use of façade analysis for individual studies of human/environment activity. However, less structured, sketch book style analysis can provide the practitioner with the simple and rapid methods which, as stated by Lynch, is what is needed³¹. **Plate 6.3.3.i** illustrates such an approach which may be considered a visual-spatial ‘description’ of a spatial-behavioural phenomenon which can be defined in terms of a setting.

Subsumed within ‘defining a unit of study’, is the following:

- b) Identify, record, describe, *spatial*-behaviour circuit

In identifying behaviour circuits there is a change of emphasis from being in a place to ‘doing things in it’.³² This is a shift in thinking that leads to the uncovering of the kind of data that will help the designer view

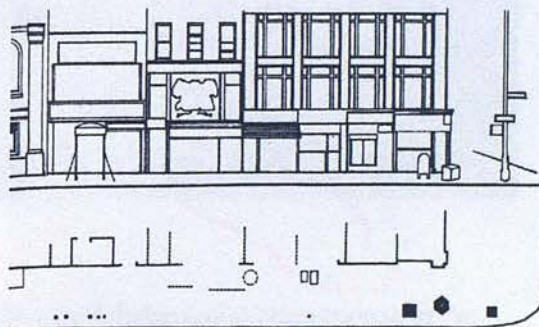
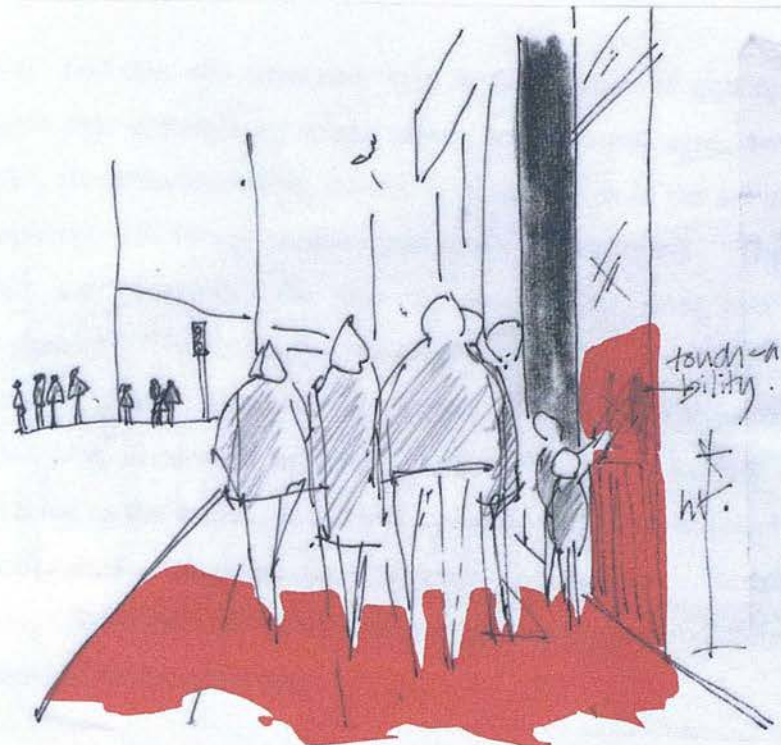


Figure 6.3.3.xii: Whyte's façade study approach.

³¹ op cit, LYNCH, Kevin, 1976

³² PERIN, Constance, *With Man in Mind. An interdisciplinary Prospectus for Environmental Design.*, The MIT Press, USA, 1970

(a)



(b)



Plate no 6.3.3.i - A visual 'description' of a spatial-behavioural phenomenon in the street setting. (a) illustrates the user interface; (b) 'maps' the spatial-behaviour setting

‘reality’ and that will ultimately help in the creation of quality environments. Perin suggests that although we might name (describe) and agree on ubiquitous behaviour circuits, (or interchangeably ‘scenarios of use’), it is in the act of looking at them that the concept will reveal realities previously unrecognised. “The concept of behavior circuits can reorganise the way we view reality, with two especially important consequences. The first is that we are prepared to be alert for differences and to design in terms of them....A second consequence of thinking in terms of behaviour circuits is that we may discover a new relationship...”³³ The behaviour circuit might thus be considered as the means, or method, of uncovering the spatial-behaviour setting, whilst the individual settings are the actual units of analysis. Essentially, it is a way of thinking about the user/environment experience, and therefore, about the type of information we are gathering.

‘Typical settings’ arise in relation to a generic pattern, or series of patterns within patterns. For example, in the wayfinding study these were considered ‘decision spaces’ but in the context of urban tourism these might be termed ‘exploratory ‘ or ‘browsing spaces’, and in street shopping these might be ‘browsing linkage’ spaces. These are discrete ‘units’ within which sub-sets of units which materialise either as a result of observation (of people’s behaviour circuits) or by conducting some task analysis using role play (imagining different scenarios of use). As emphasised already, the observation-based approach emphasised by behaviour circuitry helps analyse *how things are*, but the approach described by scenario analysis helps in thinking towards *how things might be*. These highlight two different *intentions* behind the act of identifying, recording, and describing behaviour circuits: firstly, analysis of how things *are* is a more ‘scientific’ process; secondly, thinking in terms of how things *might be* is more about design. Both, however, entail the use of task analysis.

Task analysis

The thesis proposes the use of the task analysis approach suggested by the behaviour circuit, to identify, record and describe, *spatial-behaviour* circuits. By Perin’s description behaviour circuits are composed of particular actions that take place in discrete sequences to produce specific outcomes, and they are subject to short term stimuli. The behaviour circuit is ‘a round of behaviours’ needed to accomplish each

³³ op cit, PERIN, Constance, 1970, p 81

purpose from start to finish. For designers, it is the *process* of defining the behaviour circuit that is important, not establishing scientific accuracy of it. The process itself reveals, what Perin terms, 'the subtleties of cultural diversity and cultural change'. If we consider 'culture' at the small scale unit as 'spatial-behaviour' it helps us focus the analysis. The old town of Edinburgh for example, may then be divided up into types' of experience with spatial/behavioural attributes, namely 'browsing' and 'wayfinding' – the difference being that one set of people are actively trying to find a specific destination point for example a particular museum, or historic monument, the other set simply browsing. The reality is, people are likely to be doing both, but the point is, the separation of the two activities allows for pointed analysis of the environment.

Wayfinding and browsing activities could be explored as 'facets' of experience, for example, 'exploring <entrance/doorway/threshold>'. In very brief terms, a facet, as defined by Facet Theory, is a "distinct conceptual category describing a discrete component of a particular object or area of research"³⁴. The facet approach has been developed as a method of formally defining a research area and making explicit its main concepts and hypotheses. This was originally developed by Luis Guttman and has become considered useful in moving scientific research in the behavioural sciences away from a reliance on statistical data^{35, 36}. For the purposes of this thesis, the general principle only is adopted, the method is not formally used, but rather it is simply considered a useful technique for structuring spatial-behaviour analysis.

As regards the <entrance/doorway/threshold> facet of exploring, in spatial-behaviour analysis this would in fact be an artificial unit imposed by the designer: *generically* speaking the sightseer is not analysing the environment for its doorways, for even if actively trying to find a specific museum or other attraction, or trying to find somewhere to sit down for a coffee, the entrances, although significant, are an integral aspect of the entire experience. Whether 'browsing' or 'wayfinding', when exploring the environment we are actively seeking out, and receiving, environmental information eg 'is it ok to look in here/what goes on in here/is this the right place for.....?'.

In order to analyse how a place *might* be used, this entails the need to role play an actual scenario to enable the designer to identify a 'real' set of units of study. Thus, the

³⁴ DONALD, I, *Facet Theory: Defining Research Domains*, in BREAKWELL, G M, HAMMOND, S and FIFE-SCHAW, C, (Eds), *Research Methods in Psychology*, Sage, London, 1995, p 120

³⁵ *ibid*

³⁶ CANTER, D, (Ed), *Facet theory: Approaches to Social Research*, Springer-Verlag, New York, 1985

observation study is required, and so is integral to, user needs evaluation. However, the designer must initially identify what the scenario of use is to be.

This thesis suggests that the use of the Lynch or Dee models provide points of departure for spatial-behaviour analysis eg 'threshold/doorway/entrance' since design begins with a 'first impression', which in landscape architecture, is traditionally spatial, but which can, through a subtle shift in thinking, become 'spatial-behavioural'. The following example explores this proposition.

In Edinburgh's old town, the Royal Mile experience is characterised by a series of distinctive nodes connected by street segments which are also spaces in themselves. The nodes could be identified as key 'exploratory spaces' along a route starting from Edinburgh Castle existing as a series of interconnected nodes which have physical structure in their own right, but which also accommodate certain behavioural patterns of their own. The diagram uses a label 'node^{BS}' to express the spatial/behavioural interrelationship.

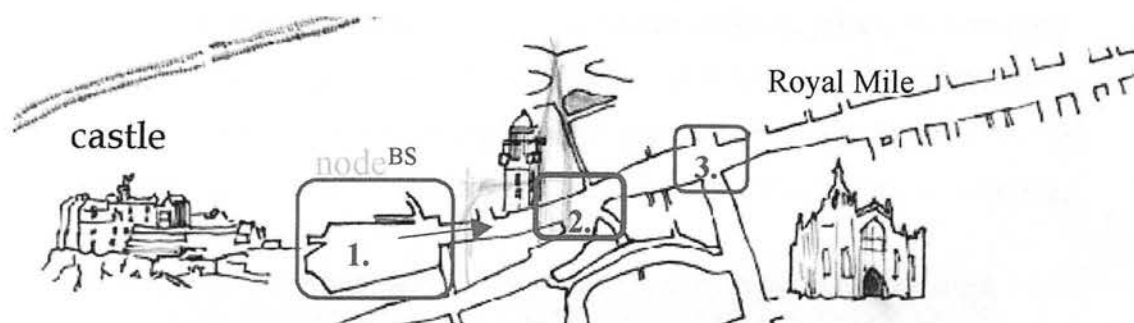


Figure 6.3.3.xiii - Establishing appropriate points of departure for spatial-behavioural analysis.

Through some environment-behaviour study, a diurnal pattern of visitor behaviour was observed during tourist season. Every morning coaches arrive in the 'Esplanade' area by the castle ('node/BS no. 1') where visitors on tour are dropped off. The coaches move away and return later. On speaking with some of the tour guides and coach drivers, it transpired that the coaches are allowed to park in a nearby street for two hours and then they must collect their tour group and move on. This is the temporal boundary of this particular behaviour setting.

Observations revealed that some visitors literally run down the road with cameras to take a quick shot of the town before rushing back to catch their coach. But there was a discernible pattern of others who had more time who would wander down the street as if

looking for something to do, or somewhere to go.

The nodes which structure the browsing sequence are shown in figure 6.3.3.iv numbered 1- 3. To ‘fast-track’ the process of identifying individual spatial-behavioural phenomena without going through a systematic observation study, or complicated mathematical procedure, and yet not take ‘node’ as the defining unit in spatial terms, potential spatial-behaviour settings are quickly arrived at through observational ‘filtering’: behaviour settings are filtered out (that is, non-settings are discarded) and the relevant settings are analysed. Node 2 in particular is identified an area where ‘indecision’ is observed in the tourist experience within the previously mentioned ‘coach stop’ behaviour setting. These occur at places where visitors are visibly either confused because they are trying to following a map, or visitors are simply unsure as to which way to go on their exploratory wanderings.

One aspect of the problem relates to *wayfinding* – evidenced by the visitors seen to stop and consult maps, asking locals and in particular the policemen (who are often present in this area) for directions, but the other aspect of the problem relates to *browsing*. These groups of visitors were distinct from others by exhibiting ‘browsing’ behaviour. This pattern of behaviour was discernible because visitors operating in browsing mode overtly exhibited their interest in looking about the environment, stopping, pointing, looking, taking photos and so on.

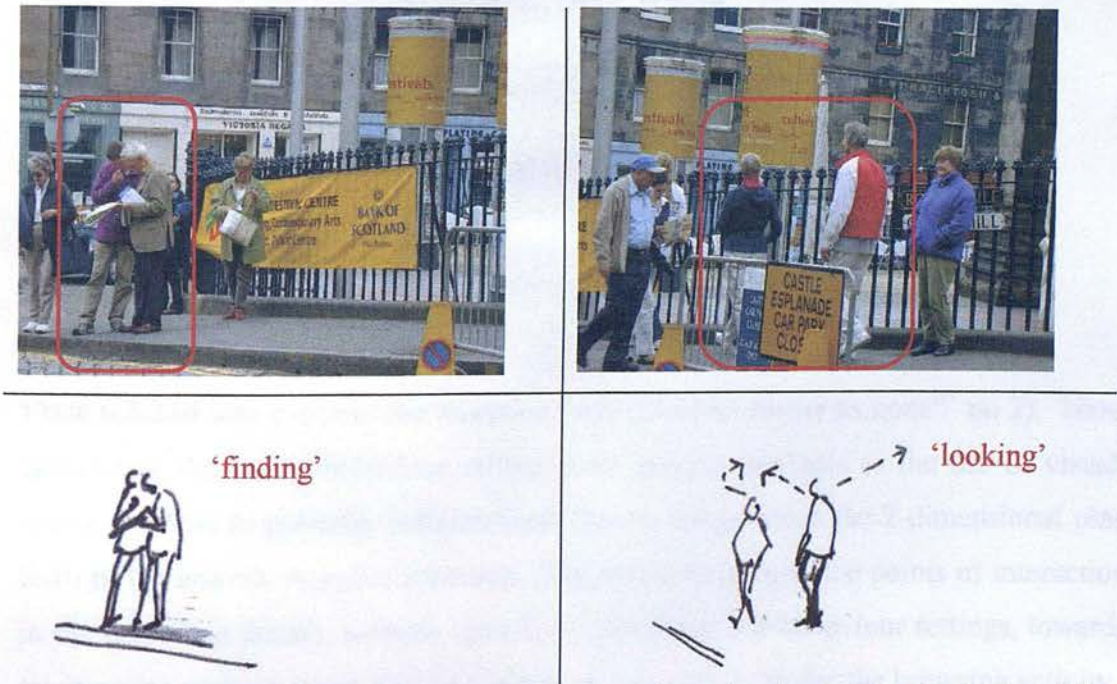


Figure 6.3.3.xiv - Distinguishing between ‘finding’ (wayfinding using the map as a navigation aide) and ‘looking’ (browsing).

Christopher Alexander suggested that some nodes in a city take on a certain importance for their role in 'receiving' people. Thus, this particular node might be termed a 'reception node' for its significance in the tourist experience. **Plate 6.3.3.ii** (overleaf) illustrates a tracking sheet, or to use Lynch's words, 'a diagram of shifting activity', of the way in which this node 'receives' people.

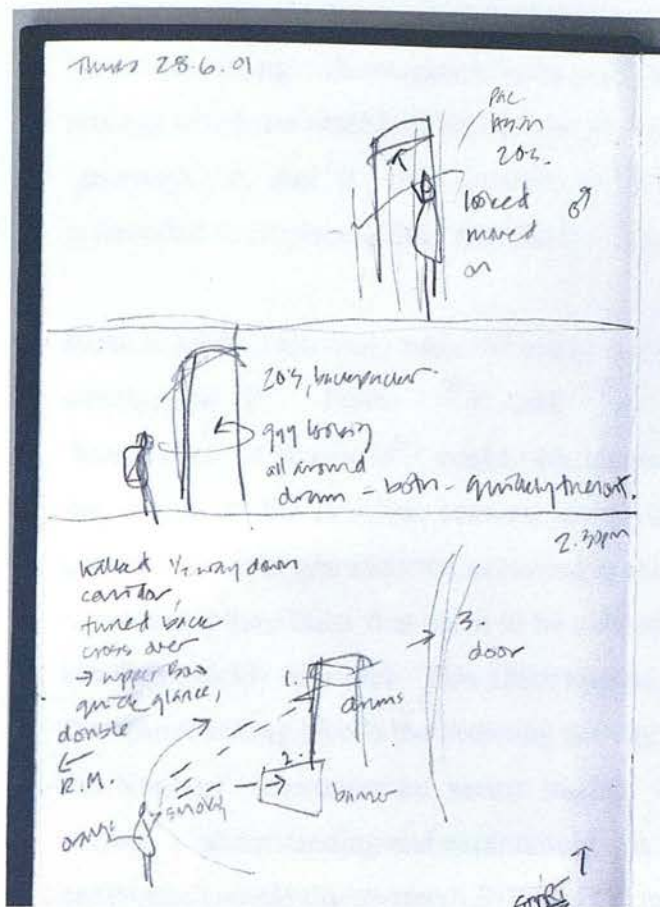
The plate illustrates a type of 'attraction analysis' which uses the visual-spatial approach to produce data in 2- and 3-dimensions. The 'loopiness' of the hand drawn red line indicates where people typically stop to pause and look around, looking in doorways, building entrances, wynds and closes as if looking for something to aim for (a goal). Typically, users walked into this street space, drawn to the converted church (known as 'the Hub')'s doorway with its bright yellow pill boxes outside (point 'A').

There seemed to be a lost opportunity for drawing visitors down into a space below which offers a particularly interest street experience, accessible via steps down into a street below at point 'B' illustrated in figure 6.3.3.xv, below.

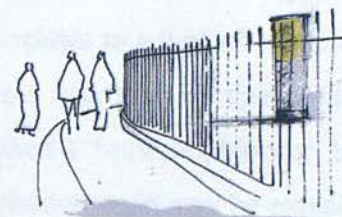


Figure 6.3.3.xv: Point 'B'
(‘Upper Bow’ in Edinburgh).

Plate 6.3.3.iii also explores the reception node (labelled earlier as node^{BS} no 2). Here, analysis of the spatial-behaviour setting gives greater emphasis to the use of visual-spatial analysis to generate 3-dimensional data to complement the 2-dimensional plan form of the activity mapping approach. The aim is to identify the points of interaction in the behaviour circuit, towards identifying individual sub-behaviour settings, towards eliciting the spatial content and form elements that help or hinder the browsing activity.



Outside point 'A': the yellow pill boxes.



Decomposing the spatial-behaviour setting at node no 2 (the 'reception' node) into individual sub-settings using the behaviour circuit technique ('BC'). This provides the means of uncovering the individual behaviour settings ('BS'). Note: 'Path/BC' – the yellow dashed line/sequence red boxes – highlights the use of the path concept to structure the analysis:

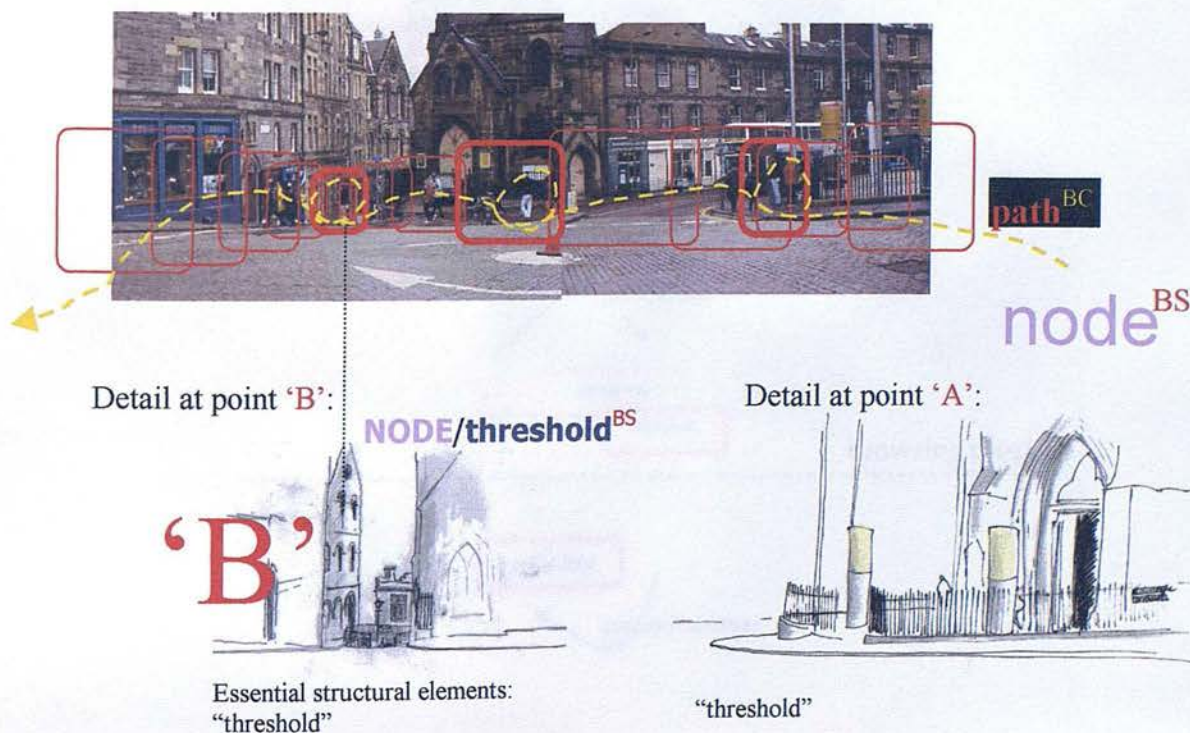


Plate 6.3.3.iii – Generating 3-dimensional data using spatial-behaviour analysis.

In other words, the process entails the decomposing of the hierarchical structure of the behaviour setting. The reception node in its entirety is labelled 'node^{BS}', whilst its sub-settings which are nested within this greater node - such as are highlighted in the plate at 'gateways' 'A' and 'B' - are examples of 'NODE/threshold^{BS}'. This type of labelling is intended to emphasise that 'threshold' is a sub-setting of 'NODE'.

Plate 6.3.3.iv (see over) takes the analysis a stage further. Here the analysis focusses attention on 'B'. Points $\bullet B^1$ and $\bullet B^2$ shown on the plate indicate where the 'boundaries' of threshold^{BS} might very approximately be drawn. This helps 'narrow the scope' of the problem towards identifying an appropriate solution type. The spatial-behaviour phenomenon occurring at this point relates to a type of 'double-back' behaviour where users first seem to be enticed to take a look towards threshold^{BS} 'B', but then quickly turn back. This effect may be considered a 'browsing blocker' because the spatial setting blocks the browsing activity. The phenomenon may be explained by the Kaplans' environmental matrix model: because of the 'silent message' of the setting, 'understanding-and-exploration' is not achieved, and the sequence coherence/complexity/mystery/LEGIBILITY implied by the Kaplans' theory, stops at 'mystery'; thus the user never achieves 'legibility'.

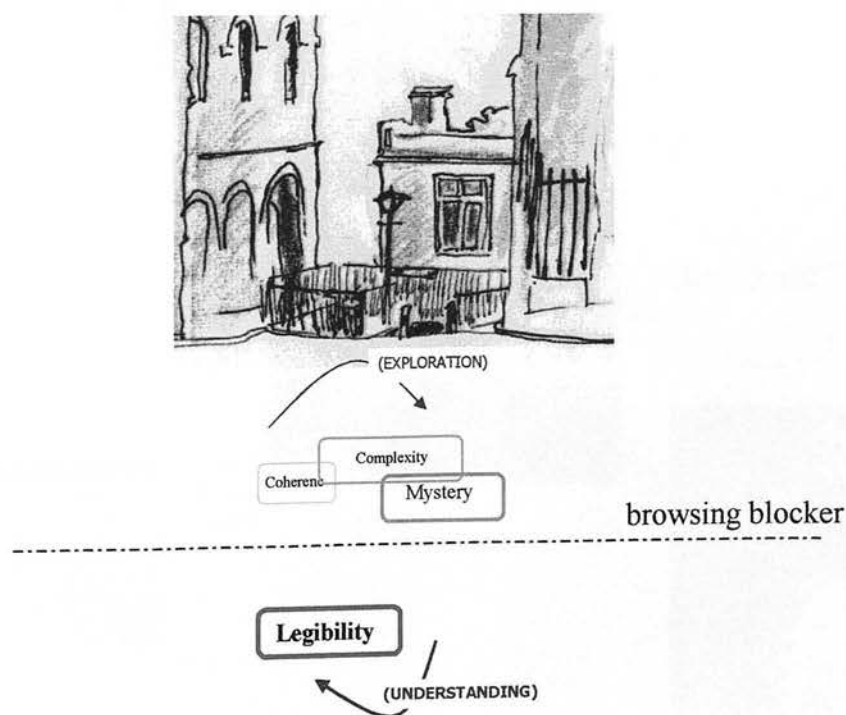
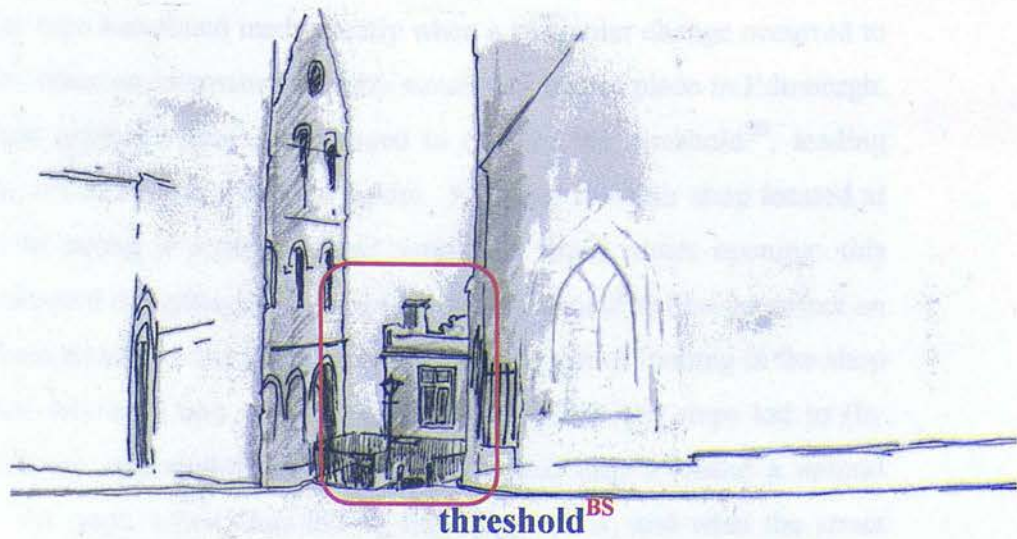


Figure 6.3.3.xvi - The 'browsing blocker' effect



The 'double-back' behaviour may be deemed a behavioural indicator of poor legibility of use – at least in this 'system'- which is one requiring an environment conducive to <exploring>. The images below illustrate a critical point in the sequence: people are drawn towards threshold/BS as if enticed through 'mystery' to take a look 'down there' but then the visitor will quickly move away, taking a double- back. Here, there is an attraction/deterrent effect communicated by the setting, which stops people exploring further, so missing out on a unique experience of Edinburgh Old Town – a street of small character shops - which users could experience if they were 'invited' by the setting to continue their exploring along this small connecting space.

'B'



threshold^{BS}

moving away
again....
(repelled)



moving
towards....
(attracted)

Plate 6.3.3.iv – 'Double-back' behaviour suggesting a mystery/LEGIBILITY problem.

A potential solution type was found inadvertently when a particular change occurred to the setting on a day when an international rugby match was taking place in Edinburgh. On this day, people *appeared* more encouraged to explore the threshold^{BS}, leading people down to the little shops in the street below. A tourist souvenir shop located at the ‘blockage’ point strung a series of flags across the small street opening: this inadvertently transformed the space into a ‘gateway’ which seemed to have an effect on people, drawing them down into the space either because the act of looking in the shop drew visitors down, which in turn enticed people to see where the steps led to (by looking over a balcony area slightly beyond the steps) and thus to make a natural mapping between the steps, where they led to, the street below, and what the street afforded them; or alternatively, this effect could have been caused simply because there was ‘something going on’ and people were attracting other people. This demonstrates the socio-spatial interrelatedness of the physical environment, but at the time helps separate out the spatial-behavioural attribute of the setting which helped create a setting conducive to environmental ‘browsing’, notably, the gateway effect of the flags – see figure 6.3.3.xvii below. This provides an ‘idea for design’ to improve the space’s legibility of use, to invite the user down into the street space below, instead of deterring a look.



Figure 6.3.3.xvii A ‘gateway’ is constructed through inadvertency and choice.

A set of banners could be strung across permanently, just as shown in the photo. These could be relevant to the Edinburgh Festival theme of the area, to create the same gateway effect but on a permanent basis. In Christopher Alexander's notes on pattern language, he states that gateways work in conjunction with transition spaces: he states that gateways are the starting points of pedestrian circulation, and that they should be treated as 'things', or solid entities, rather than holes or gaps.³⁷ Crucially, there needs to be a sense of transition, or a sense of passing from one space into the next, which in this instance, is only experienced by local people who know that there is a way through here, and which outsider people are not experiencing because the environmental message is 'dead end'.

The use of integrated spatial-behaviour analysis as explored so far indicates its potential use as a diagnostic tool. Spatial-behavioural phenomena in the setting were identified and decomposed into spatial-behavioural circuits within circuits, breaking down the units into smaller units until their individual spatial-behaviour attributes could be isolated. These were those factors that had a cause-and-effect influence, that is, helped or hindered a user in accomplishing a task that needed to be carried out in direct relation to the user's intent (or purpose). Thus the problem-setting and information gathering process are integrated towards identifying 'problems' which may be resolved through design intervention. The cause-and-effect diagnosis may be summarised as shown in figure 6.3.3 xviii below.

The cause-and-effect diagnosis highlights the utility of the Kaplans' understanding-and-exploration model in its 'dynamic' form (as developed by this thesis). Thus, the model not only *explains* the existing situation, but it helps *predict* the likely behavioural effects of a proposed design intervention – a 'gateway' of flag banners in this instance.

³⁷ ALEXANDER, Christopher, A Pattern Language: towns, buildings, construction, Oxford University, 1977, p 278

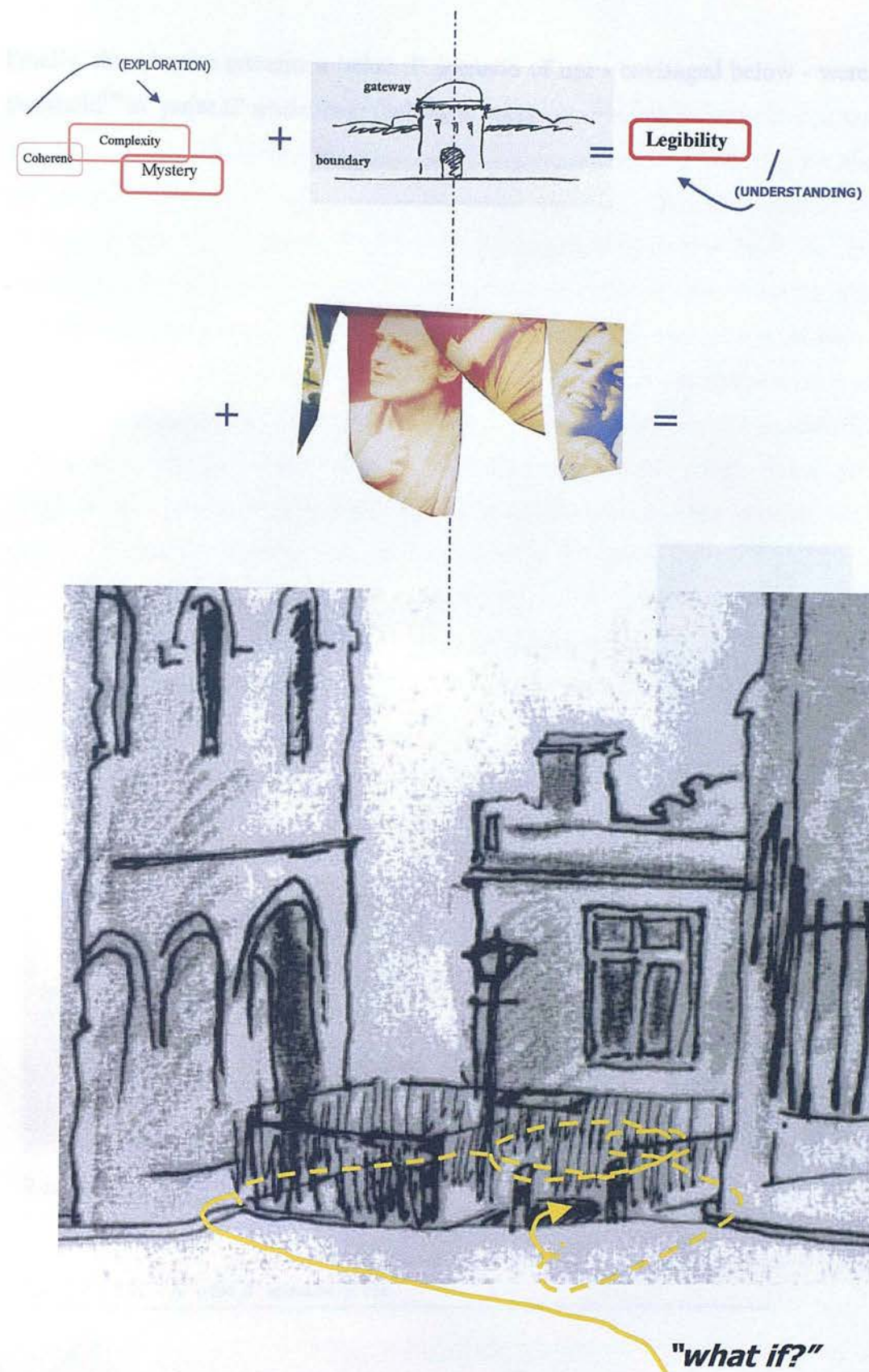
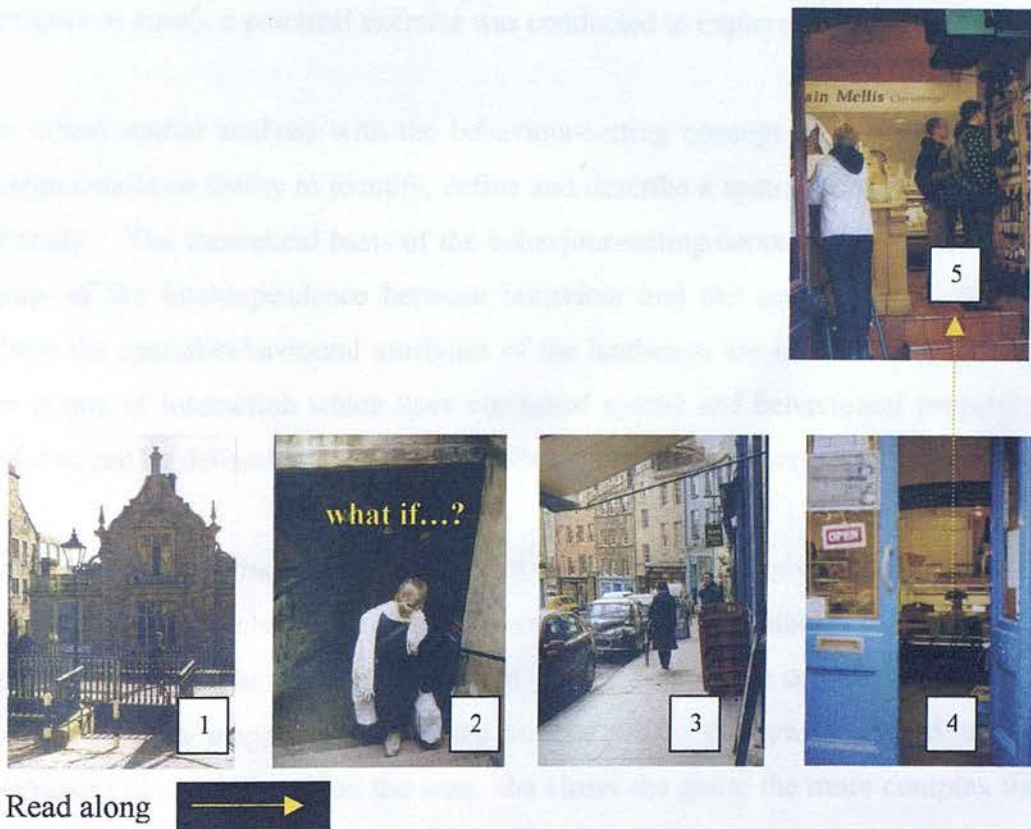


Figure 6.3.3.xviii - Cause-and-effect diagnosis.

Finally, this chapter presents a ‘what if’ scenario of use - envisaged below - were the threshold^{BS} at ‘point B’ made more inviting to users:



6.4 SUMMARY

The behaviour setting and behaviour circuit theories were explored for their compatibility with spatial analysis. The combined theories, when embodied in spatial analysis, appeared to be useful for conceptualising, describing and analysing the human use of space, using a spatial-behavioural mapping approach. Thus, the potential utility of the approach as a design tool for interpreting the landscape from the user's perspective was established. However, it was suggested that in their translation from research into design, the subtleties of the behaviour setting theory and its twin the behaviour circuit had become 'lost' in complex word and numerical form on the one hand and over-simplistic diagrams on the other. In a conscious attempt to embody the behaviour setting and circuit concepts in spatial analysis in 'image' form, and to integrate them into the design thinking process (and thus research the problem *with the designer in mind*), a practical exercise was conducted to explore theory 'in action'.

To infuse spatial analysis with the behaviour-setting concept for effective use in design entails an ability to identify, define and describe a spatial-behavioural 'unit' of study. The theoretical basis of the behaviour-setting concept was explained in terms of the interdependence between behaviour and the environment. This is where the spatial-behavioural attributes of the landscape are identifiable – that is, the points of interaction which have combined spatial and behavioural properties and that can be defined in terms of spatial-behavioural phenomena.

Basic ecological principles were highlighted to help in applying the theory in practice. Spatial-behavioural settings could not be determined by scale alone because it was said to work in conjunction with 'grain'. Scale described the spatial proportion of a mapped area (eg the street), whilst the grain referred to the coarseness of elements within the area: the closer the grain, the more complex the spatial-behavioural landscape becomes. The theory was used to derive a 'system image' model for potential use in wayfinding design. To further explain the potential application of the theory, a visual aide (or mental schema concept), was presented for conceptualising the hierarchical, nested, structure of behaviour settings in space, and how behaviour setting theory, in combination with behaviour circuitory – and when embodied in the spatial sequence technique - can help uncover the nest of units within units, towards identifying user needs requirements.

A set of principles and procedures for spatial-behaviour analysis emerged. Once the 'units' and the dimensions of the problem were identified and described, integrated spatial-behaviour analysis identified cause-and-effect linkages between the spatial configuration and 'content' of a place. In this way the tool was able to 'map' spatial-behavioural units for analysis.

As a mapping tool, integrated spatial-behaviour analysis appeared to enable the designer/researcher to identify a problem-setting, 'reduce' the scope of the problem, decompose the setting into task-related sub-settings, and thus identify the physical factors that help, or hinder, a certain activity-type taking place. The application of integrated spatial-behaviour analysis for cause-and-effect diagnosis was illustrated, highlighting the utility of the Kaplans' understanding-and-exploration model in its 'dynamic' form, as a predictive tool for design.

In summary, spatial-behaviour analysis may be considered a problem-setting/information gathering/design 'evaluation-in-action' tool, tailored to the needs of the landscape architect, which can bring the landscape into perception from the user's perspective at design inception stage *before* the landscape is dealt with, *during* information gathering, and towards identifying appropriate final design solution types.

Conclusion

The utility of behaviour setting theory and behaviour circuitory in landscape analysis is dependent on the ability of the theory to help designer's identify and describe discrete spatial-behavioural units of study. The set of principles and procedures outlined in this chapter offer a set of basic concepts, techniques and a type of terminology, which through further development could provide designers with a useful, and usable, tool for integrated spatial-behaviour analysis. Essentially the tool offers a way of integrating behavioural knowledge by applying it for the purposes of *interpreting* the landscape from the user's point of view, but in a design-like way.

In this chapter, the application of spatial-behaviour analysis has been mainly discussed for use as an *interpretive* tool whereas its *predictive capability*, in the sense of helping designers 'know more in order to understand', merits further study. Since the point of

incorporating user needs evaluation into the design process is to enable designers to be able to better predict the consequences of their actions, the next chapter will identify some useful strategies for predictive thinking. Afterwards the thesis moves on to explore the methodological implications of applying integrated spatial-behaviour analysis in a real world practice situation.

Chapter 7:

STRATEGIES FOR PREDICTIVE THINKING

7.1 INTRODUCTION

This chapter highlights three areas which may potentially provide theories, concepts, and tools which are useful to landscape architects for enhancing predictive thinking in the spatial-behavioural approach to landscape analysis. The three areas are examined for their ability to help designers 'know more in order to understand' in the context of wayfinding design. The chapter 'situates' its discussion in site survey analysis.

The last chapter highlighted the utility of spatial-behaviour analysis as a problem-setting/information gathering/design 'evaluation-in-action' tool, tailored to the needs of the landscape architect, helping to bring the landscape into perception - from the user's perspective - at design inception stage *before* the landscape is dealt with, *during* information gathering, and towards identifying appropriate final design solution types. This chapter will focus on the information gathering stage beginning with a discussion on its relevance to the applicability gap problem; this is followed by an exploration of the applicability of a) space syntax theory, b) decision theory and c) scenario analysis to landscape design for enhanced predictive thinking, and thus, for aiding the decision making process. Although the three named areas have already been referred to and discussed to some degree, this chapter examines the various theories in greater depth for explanatory purposes with a pretext towards improving understanding and communication between research and design.

7.2 INFORMATION GATHERING FOR PREDICTIVE THINKING

The degree of success in making predictions about the human use of space (using integrated spatial-behaviour analysis) is dependent on what, and how, knowledge is applied to evaluate design 'in action'. In other words, the thinking process is important:

"My contention is that the cognitive operations called thinking are not the privilege of mental processes above and beyond perception but the essential ingredients of perception itself. I am referring to such operations as active exploration, selection, grasping of essentials, simplification, abstraction, analysis and synthesis, completion, correction, comparison, problem solving, as well as combining, separating, putting into context. ... There is no basic

difference in this respect between what happens when a person looks at the world directly and when he sits with his eyes closed and “thinks”. ”¹

Design is by default a predictive process in that it must imagine future outcomes. The decision making process is a fundamental background ‘structure’ in design thinking - a process which occurs in the complex setting of the environment. If the theories which structure the thinking process in design (in this case the landscape architecture knowledge base) are inadequate, the environmental information that the designer selects may be ill-structured in the beginning. Notably, if the initial problem-setting process is ‘spatial/behavioural’, rather than ‘spatial’, the designer should (in theory) be better able to respond to user needs. Intentions are also important. If information is gathered during the site survey to ‘test’ (or evaluate) and explore one’s hypotheses about the nature of ‘the problem’, rather than simply gather information to support a conjectural claim, one’s predictive capabilities are greatly enhanced. The problem in design is in shifting the mind set in thinking in terms of alternatives, once an initial design idea is hit upon.

Descriptive studies of the design process as it naturally occurs have concluded that knowledge cannot be searched for or applied in the absence of initial ‘solutions’.² “In other words, ‘analysis’ or the search for scientific knowledge, the first phase of design according to the rational method, cannot take place until the solution presents itself. This solution, then, defines the form and content of the knowledge needed for support and elaboration.”³ Essentially ‘form image’ is an ‘ordering principle’ in information acquisition and Sancar states that, in effect, the designer’s interaction with existing sources of information is structured by the availability and nature of such ‘generators’.

This thesis suggests that with the right thinking models, landscape designers should be able to improve their performance in predictive thinking without having to compromise the creative design process. The human brain, whether designer or layperson, needs simple models for structuring informational input in order to deal with it effectively. The recognition of this need has underpinned decision theory which has in turn led to greater understanding on how the human can be more effective in making predictions:

¹ ARNHEIM, Rudolf, *Visual Thinking*, University of California Press, USA 1969, p 13

² SANCAR, Fahriye Hazer, “Behavioural knowledge integration in the design studio: an experimental evaluation of three strategies”, *Design Studies*, Vol 17, Issue 2, April 1996.

³ *ibid*, p 134

"Because the environment in which people must make decisions is far more complex than the human mind, people are forced to adapt their limited abilities to the structure of the problems they face. Thus, the key to understanding people's choice behaviour lies in understanding how they have come to represent the choice task in their minds."⁴

This indicates a problem of knowledge integration *and* generation. According to Sancar, a key reason why environmental design researchers fail to produce design-relevant and usable knowledge for design, is that the information gathering process is carried out with a different *intent* to that carried out for design purposes. The argument states that whereas landscape designers are concerned with the particulars of each situation when information gathering during site analysis and the early stages of design, researchers are concerned with the making of universal laws and on "measurable aspects of the phenomena, rather than those less easily quantified."⁵

In research, the scientific bias orientates the researcher towards information gathering that precludes subjective, place specific and contextual 'information'. This, the argument states, impacts on the type of knowledge generated which tends towards list information in the form of specifications; these in turn appear non-design relevant to designers who are then unable to integrate such knowledge into their design process.

Three areas will now be considered for their ability to introduce and enhance a landscape architect's predictive capabilities.

7.3 SPACE SYNTAX

Space Syntax is a revolutionary tool for spatial-behaviour analysis and has had a particular impact in the architectural sphere. It is designed to simulate the likely behavioural effects of designs on users and has been applied in a variety of fields including architecture, urban design, planning, transportation and interior design. Hillier et al have demonstrated a link between spatial design and space use and as a result have shown that they can forecast the likely effects of new developments on a range of issues including pedestrian and vehicular movements, patterns of crime in housing estates but also other more commercial applications such as customer distribution in retail developments.

⁴ HOGARTH, Robert, *Judgement and Choice. The Psychology of Decision*, 2nd Ed, John Wiley & Sons Ltd, UK, 1987, p 71

⁵ op cit, SANCAR, Fahriye Hazer, 1996, p 133

Essentially, space syntax adopts the idea of behaviour as a strategy for design and uses sophisticated mathematics to check intuition. Space Syntax is a tool for spatial analysis which is considered revolutionary in its ability to ‘evidence’ intuition. However, it is a tool that needs specialist computer software and training to apply it. It is also intended to be used in combination with detailed observations.

Space syntax can consider both macro and micro patterns, both moving and stationary. It is used to model a variety of activity types with the intention of assisting designers in developing [building] layouts which allow different activities to occur without coming into conflict. It can apparently forecast patterns of movement with 75% accuracy through its computer modelling⁶ and, unlike conventional pedestrian modelling techniques which apparently focus on origin-destination calculations in order to forecast ‘programmed’ activities such as passenger flows from arriving trains to a station, Space Syntax can take into account ‘unprogrammed’ activities such as ‘shopping’, and ‘waiting’. For this, the space syntax approach incorporates the use of ‘activity mapping’ to bring research into design.

Space syntax offered the Trafalgar Square design team in London an opportunity to test the outcomes of a proposed design intervention involving the pedestrianisation of the road to the north of the square. Figure 7.3.i illustrates the before and after scenarios of predicted use.

Space syntax explained

Space Syntax is a tool for analysing the configuration of spatial systems. According to the theory of space syntax, space has its own rules which humans use without thinking when moving from one place to another and therefore, according to the theory, the way public space is used can be mathematically predicted.⁷ The root of the theory is that people have a preference for easy journeys with the least amount of effort involved. It has a basic model which transforms a total spatial system into *axial lines*, which are defined as the fewest and longest set of lines of accessibility and visibility that can be

⁶ MAJOR, David, STONOR, Tim, PENN, Alan, “Passengers, Pedestrians and Shoppers: Space syntax in design”, February 1998, as produced in <http://www.spacesyntax.com/development/article.htm>

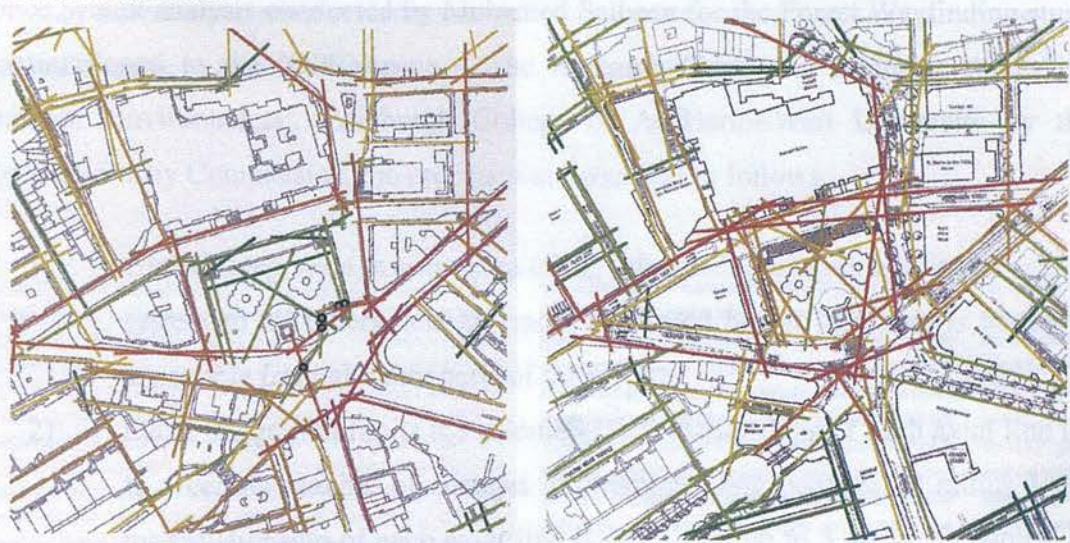
⁷ HILLIER, Bill, *Space is the machine : a configurational theory of architecture*. Cambridge University Press, 1996.

drawn in the spatial system.⁸ This model is then analysed according to the connectivity of each axial line to all others in the system.

The concept of connectivity is central to the theory. According to Hillier, the social dimension of space exists as a 'continuous thing', and ease of movement within it is therefore fundamental. According to the theory, good spatial connectivity – both physical and visual - enables ease of human transition through the system. The visual aspect is emphasised by Hillier who interlinks the human need to 'see and be seen' in space which is well used by other people.

BEFORE PROPOSED DESIGN
INTERVENTION:

AFTER:



(a)

(b)

Figure 7.3.i - Before and after scenarios in space syntax, as used in the Trafalgar Square design process. (STONOR, Tim, 1998, pp 95-98)

The concepts of connectivity, visual accessibility and spatial continuity interlink with landscape thinking. These concepts occur at all scales in the landscape, and whether analysing the urban or rural context area, 'space' is all part of the same system since, as stated by Lynch, it is all part of the "continuous spectrum of human habitats".⁹

Spatial connectivity in the landscape

The application of Space Syntax as a spatial modelling tool has its theoretical foundations in architecture but since it has wide application in different open space

⁸ as described for use in some analysis produced by Mohammed Salheen, for FINDLAY, Dr C, SOUTHWELL, K, WARD-THOMPSON, Catharine, ASPINALL, Peter, "Effectiveness of Wayfinding Systems with Forest Users. Phase One: A Site-Specific Scoping Study", Report to the Forestry Commission, Landscape Design and Research Unit, School of Landscape Architecture, Edinburgh College of Art, Heriot-Watt University, January 2001

⁹ LYNCH, Kevin, *Managing the Sense of a Region*. The MIT Press, Massachusetts, USA, 1976, p10

settings (albeit in the urban context) the tool's capabilities should be of relevance to landscape architecture.

Space syntax has application for introducing a systems analysis approach to spatial-behaviour analysis.

The space syntax method

Using a purpose-designed computer software package, space syntax can operate at any scale, calculating degrees of line connectivity by measuring integration. There are two main types of integration termed global and local (see figure 7.3.ii). In a report on space syntax analysis conducted by Mohamed Salheen for the Forest Wayfinding study commissioned to the 'OPENspace – The Research Centre for Inclusive Access to Outdoor Environments', Edinburgh College of Art/Heriot-Watt University by the British Forestry Commission, the process was described as follows.

- 1) Global integration is a measure of the relationship of each line in the spatial system to all others, and the most integrated line it identifies is the most accessible from all other parts of the system.
- 2) Local integration limits the calculation of relationships of each axial line up to a certain number of changes in direction. For example, in radius 3 the interrelationship of each axial line is calculated up to 3 steps of changes in direction, so it is a more local measure of spatial properties of each space.

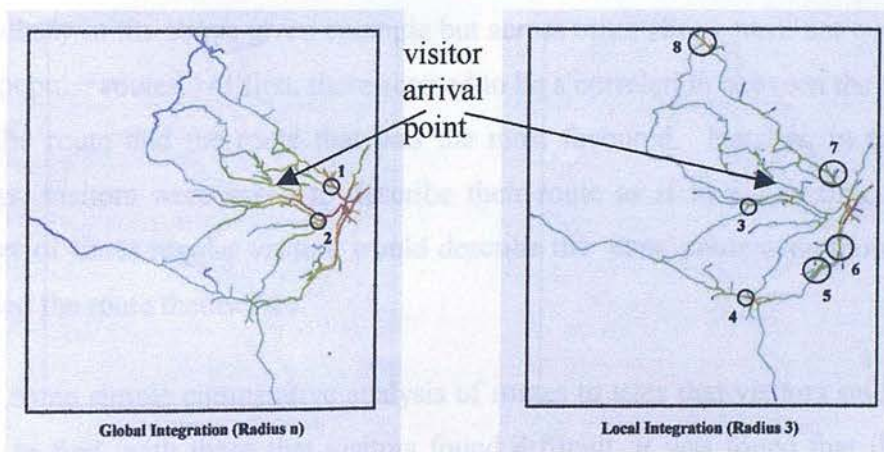


Figure 7.3.ii – Using Space Syntax to analyse the accessibility of a Forest site in Wales (the main visitor arrival area) within the given route system. The red lines indicate the spatially dominant routes, in a gradient from orange to yellow to green and finally blue. The blue lines represent the least integrated routes which have low connectivity in the system and therefore the least accessibility.

The connectivity of the line intersections within the axial system is a key factor in calculating integration. In the context of the wayfinding study the decision making process was considered. For this, the intersections were taken to represent a wayfinding task. In very simplistic terms, because the site in the above example was located away from the reddish lines on a line more towards the blue end of the spectrum, the space syntax calculation indicates that the site rates low on accessibility.

The potential of the theory

The application of space syntax in the forest wayfinding study was experimental, since most space syntax studies are conducted in the built environment. The tool presents a new potential because it is a predictive design tool with high reliability. For forest wayfinding it was used to predict the easiest routes to a given site.

In the study, space syntax could not take into account visual accessibility along the roads because the space syntax analyst only applied the technology from a map study. But this provided an opportunity to explore the predictive capabilities of the tool and its usefulness, were it to be complemented by, or even substituted for, a landscape architect's site survey analysis – in this instance, analysis which integrates spatial and behavioural thinking. In the event, space syntax became useful for comparing the most often cited routes to individual sites (as revealed in interview analysis), with the routes that space syntax predicted as being easiest, as a starting point for analysis.

What was interesting was that the routes space syntax predicted as being easiest – not particularly in the above given example but across other sites - were not necessarily the most popular routes. At first, there seemed to be a correlation between the most easy to describe route and the route that was the most favoured. Notably, in the interview surveys, visitors were asked to describe their route as if to a first time user, and a number of times regular visitors would describe the 'easy' route even though they had not used the route themselves.

Using some simple comparative analysis of routes to sites that visitors said they found 'easy' to find, with those that visitors found difficult, it was found that if a complex route system was well signed it was easy to use and therefore easy to describe to others. For example visitors would say 'just follow the signs for Dalby Forest Drive from Pickering', and conversely if it has a relatively simple route structure with perhaps only one or two key junctions but which are badly signed, and/or it has an entrance with poor

visual access, the route system presented difficulties and consequently was more difficult to describe to others, for example 'M4, Junction 40, brown sign then go through two roundabouts, up valley, past big rock. Don't turn in at 1st car park, travel on a bit and turn right into the site.'

The ease with which a route to a site can be described must have an impact on a site that is not off a main connecting route (that is, a route that is low in spatial integration) because such sites rely more on 'word of mouth' as a key source of information and for the decision to visit in the first instance. This contrasts with the sites which are located off a main connecting route which have a much higher 'visibility' in the wayfinding system, being located on a spatially dominant route. Even if the site itself is not visible in the view from the road, signs have the potential to draw visitors in. Thus, without signs, space syntax is helpful in showing which routes are naturally easiest, but it will not show *where* signs are most necessary. This is related to a limitation in the technology to take into account lines of visibility.

Another limitation of space syntax, as the technology currently exists, is its inability to take into account topography. Initially, because of this limitation, together with the fact that the method can appear complicated, highly technical, and confined to the built environment, there was a general feeling in the landscape architecture community that the sophisticated technology that space syntax provides is of little benefit to landscape design and unlikely to have application in the workaday context of landscape practice. However, there would appear to be an increased interest in space syntax, where it has been commissioned by some landscape architects for use in urban-based projects.

The degree to which computer analysis of spatial behaviour is able to overcome the problem of topography is yet to be seen. In the meantime, it would appear that the application of space syntax in the countryside setting is best conducted in combination with a landscape architect's spatial analysis for contextualising the research. Based on this researcher's own impressions, and in the context of the current discussion (which seeks to identify strategies for introducing predictive thinking for wayfinding design), the most useful contribution of space syntax is its theory - in particular, the concept of 'connectivity'.

The use of 'connectivity' as a criteria for evaluating a signage system became possible in different 'dimensions' of the wayfinding experience when travelling along the key

route identified by the landscape researcher (and verified in interview surveys) as the most easy route to site. Using integrated spatial-behaviour analysis as a ‘cause-and-effect’ diagnostic tool, the role of ‘connectivity’ is explained as follows:

Connectivity as a criteria for design

As a criteria for spatial quality, connectivity appeared to be interlinked with legibility and complexity arising in the fourth dimension of time and movement.

Example A: Space syntax bases its predictions on the fact that humans have a preference for the shortest, simplest route: however, this is relative to the user’s role (in this instance a first time user), and the ‘destination’ which space syntax is measuring its connectivity with. For example, the scenic drive could be ‘the destination’, or a particular point along it; the user might be actively ‘finding’ something in particular, or simply ‘exploring’ in a browsing mode of behaviour. In the example below, when travelling along the key route to this site, even though space syntax indicated that this route was not the most ‘simple and easy’ route, in fact this was the best route to site from an experiential point of view. Because the route was set up high up



Figure 7.3.iii – taking the scenic route to a forest recreation site in Wales.

in the landscape, and was part of a signed scenic route, firstly, the site becomes easier to find because it is along this route anyway (albeit that this is a longer way to reach it), and secondly, if visitors did not travel to site along this route (but instead took the quicker route) they would miss out on a spectacular experience through an area of scenic beauty; after all, the visitors that this site wishes to attract are outdoor leisure seekers.

The leaflet advertising the site at the time of the visit, gave directions via the simplest and *potentially* easiest route – the same as predicted by the space syntax as the easiest. However, on analysis of the route experience, it was found that by going this way the user is presented with a very complicated and stressful experience with decision points

badly signed – either not signed at all or giving mis-information about distances. Since the ‘easy’ route is placed deep down in the valley, whereas via ‘the scenic route’ is high up in the hills, from an experiential point of view, when travelling along the scenic route, as illustrated, it is possible to build up a good picture of where the forest is situated ahead, and the route to it, thus enabling the user to visually **connect** all parts to the whole. In other words, this facilitates the mental mapping process. In addition, this route affords the user with many opportunities to enjoy the countryside drive experience, encompassing different view points, including ice cream and toilet stops. When driving along the scenic route the site becomes an incidental, but intrinsic part of the whole experience – a mountain/forest/lake setting – the area’s ‘essential character of use’.

Example B: The photo illustration alongside, is of a route to a different site. Here, the route is not the ‘simplest and easiest’ when looking at the map, and as identified in the space syntax analysis, as there is a complex series of turns. However, the route experience becomes straightforward, simple and easy to use because of the sign placement. Signs



Figure 7.3.iv – sign placement on a route to a forest recreation site in Yorkshire, England.

along this route are generally located in the right place at the right time (where a choice of turnings is presented) and are easy to understand. Thus, they **connect** the driver from one route to the next with ease of movement without any difficult decision making involved. However, at other sites with similar road structures, in the absence of signs, or signs which were difficult to understand, the experience became ‘complex’; the one issue relates to sign placement, the other to sign content:

Example C: Where sign wording, colour, symbols and style of signage was consistent throughout the journey and all signs were clear and unambiguous in their message, even where a number of complex route turnings were required, the whole experience seemed ‘simple’ to users because the sign content, in combination with sign placement, **connected** or unified the experience; but where there is a lack of consistency in the sign content, such as switches in style, colour, references to



Figure 7.3.v – an example of sign content which is clear and simple. In this example, the use of the brown and white tree symbol was used in a consistent manner, along the entire signage system, leading the wayfinder with ease, directly to site.

the site by different names, the journey became more complex. Furthermore, where a sign stated the name of a site differently to the name advertised for example in leaflets, or did not emphasise a key activity that was part of its main attraction, eg 'the mining museum' there arises a **lack of connectivity** between user expectation and information provision.

Example D: In a further example (see figure 7.3.vi below) it was discovered that a route which affords the user with *time* to make the decision to enter can effectively 'pull' passing people in to have a look even when the site is completely hidden from view. Users who were interviewed at the site which the sign below indicates, predominantly stated that they found it by accident, that their visit was unplanned or that they had passed it many times before. This indicated that the signage was working very well in relation to the spatial setting and user needs and expectations.

When asked to give their reasons for visiting, users made frequent mention of the tea cup symbol. References made to 'the sign for refreshments' is notable: firstly, by the variety of interpretations given to this one symbol and secondly, for its 'pull' effect. One person referred to the symbol as a 'coffee cup' another called it 'the picnic sign', and another called it 'the café sign'. But the response to this single sign should be considered in the context of the entire route experience, since along this route scenario, the user has already passed by two practically identical signs showing the same set of symbols at 1 mile advance warning and then again at ½ mile.

By the time the user arrived he/she would have had a) plenty of time to make the decision to enter, b) time to make an association between the tea cup symbol, what the site at Coed-y-Brenin could offer them and what their own needs were, and finally, c) time to focus the eye on the tea cup symbol on approach, and, notably, d) where the first sign arrived when coming from the direction shown, the sign coincided with a point along the road where a strong sense of arrival in a forest-like area was felt, that is, a 'forest threshold experience'.

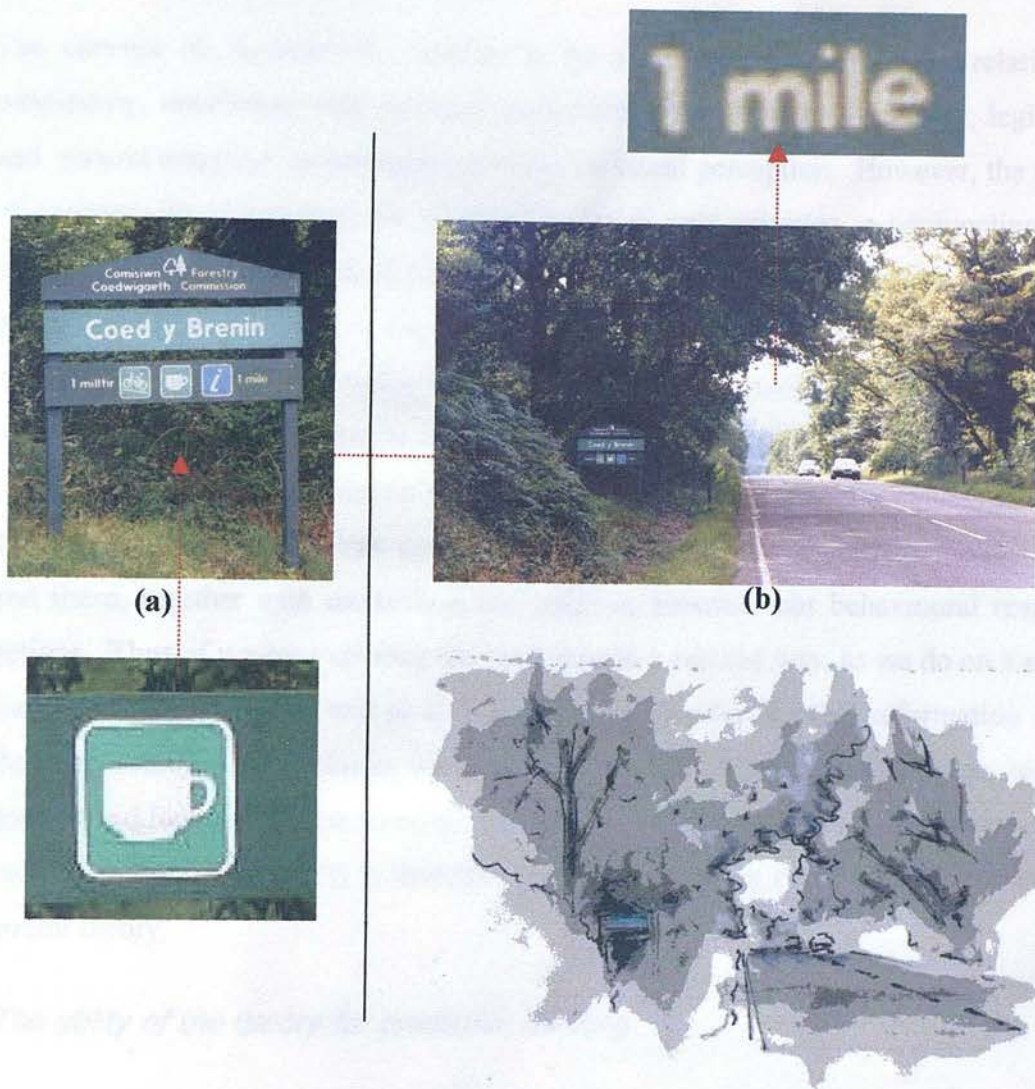


Figure 7.3.vi - connecting signage content, placement, and the physical setting with its context of use: (a) sign content communicates what the site affords the visitor in relation to the *typical* usage of this site and (b) sign placement where a *natural* threshold occurs helps communicate to the user that the site is approaching: this effectively structures a transition space.

Essentially, what the user was given here, was an extended ‘decision space’, with a useful time frame, given the fast speed of the road, within which to make the decision to turn-off. This is effectively a transition space along the road which exists *experientially* in relation to the decision making process. Notably, the signage siting and its content (ie, the wayfinding design) **connects** well with the spatial experience along the road, in communicating effectively what the site affords the first time user in relation to what the user is likely to expect when travelling along this key connecting road (a refreshment ‘pit’ stop), when to expect and make the decision to enter.

The potential of the theory

The concept of 'connectivity' appears to be a key unifying criteria in relation to wayfinding, interlinked with concepts embedded in the Gestalt, affordance, legibility, and 'natural mapping' as embodied in theory on visual perception. However, the utility of connectivity as a criteria for wayfinding design only operates in conjunction with other 'experiential' concepts of place. The findings are partly explainable by the Kaplans matrix which describes how the 'deeper' we penetrate a landscape the greater our 'understanding' of it; we also know from visual perception studies, that humans must be moving through a landscape in order to build up a 3-dimensional image of it. The principles of gestalt in common movement and experience, and the natural mapping concept enable humans to link up, or make relationships between environmental input, and these, together with motivation and purpose, structure our behavioural response actions. Thus, if we are exploring the landscape in a relaxed way, as we do on a scenic tour, we are less stressed and so able to comprehend more detailed information about their environment. The slower we drive, the more the details of a landscape, in both content and form (its structure) come into focus in the driver's view from the road. The concept of role (the user's) is therefore important – just as Perin stated in behaviour circuit theory.

The utility of the theory for predictive thinking

In the practice situation Schön states the need for incorporating rigor 'on-the-spot'¹⁰. In the context of the behavioural science/landscape design gap problem, this thesis proposes that by incorporating spatial-behavioural compatible concepts in basic techniques for landscape analysis, the designer can incorporate thinking in terms of 'cause-and-effect' between environment and behaviour in the design process *whilst it is going on*. The problem is that environment-behaviour theory and its concepts as derived from behavioural science, must infuse designers 'deeply embedded ideals' about space itself as established in design theory.

The thesis suggests that environment-behaviour interactions can be 'acted out', or role-played, just as described by Perin for the behaviour circuit, but used in combination

¹⁰ SCHÖN, Donald, A, *Educating the reflective practitioner : toward a new design for teaching and learning in the professions*. Jossey-Bass, San Francisco, 1987

with the Lynch or Dee model, together with Cullen's spatial sequence technique, or Lynch's sequential form, depending on whether the setting is a 'loose' landscape structure and whether its experiential qualities are being examined at driving or walking speed.

In place of the 2-dimensional notation form that Perin and others suggest, the acting out of the 'spatial-behavioural' sequence enables the designer to *bodily* experience the interactions as they occur in reality, using selective visual analysis to extract from the environment the *spatial-behavioural* information that helps and/or hinders the user accomplish a specific sequence of tasks. This offers an approach that does not artificially separate behaviour from the environment, but rather filters out the relevant 'interactional' spaces and their content intact, as it were, in the context of its background setting. In this way the 'user interface' can be defined by recording the experience using the spatial sequence technique.

Using the spatial sequence technique it seems to be possible to decompose the small sequence of needs into a visual sequence of spatial-behavioural interactions – that is, the smaller 'chunks' of the larger behaviour setting in a purpose led approach. This may be 'coarse' grain, for example as experienced at driving speed, or 'fine' grain, as experienced at walking speed, and it can map purpose-led human movement through space in terms of what it affords the user. These are the *specific* elements of landscape 'content' that help or hinder the user in accomplishing his/her intended task, communicated in the third dimension of the interpretive sketch and captured the fourth dimension of time and movement (spatial sequence). See plates 7.3.i and 7.3.ii for an exploration of a route experience for establishing user's wayfinding needs at a woodland amenity site outside London. This visual-spatial analysis is carried out with the intention of identifying key landscape features that can be used for published maps, and notice boards to help users locate the site, and, to help identify what minimal signage or other design interventions might be made along the road side and at the site's perimeter, to improve the user's chances of finding, accessing and using the site. This type of analysis is intended to identify what is needed and where, firstly role-playing the route experience along the road by car, then arriving at the site by foot.



(links in with
<arrival>
<route no 2>)

as you turn into
Hall Lane the
pylons become a
very prominent
feature in the
landscape.

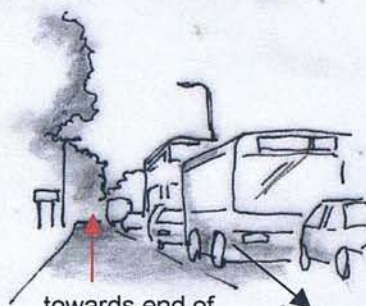
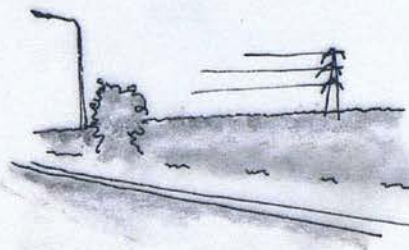
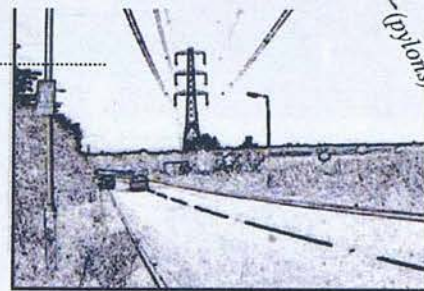
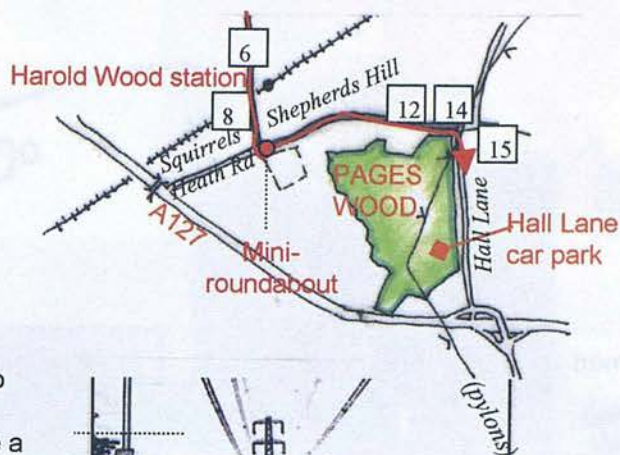
rapid transition to
'country lane' feel with
hedges: these block
the immediate view of
Pages Wood: with no
threshold signs in use
and no mature tree
growth, there are no
clues as to the
whereabouts of the
Wood

Squirrels Heath road
towards the A127
markedly busy with traffic
compared with the route
away from it in the
direction of Pages Wood

the mini-roundabout: – a
distinctive route
landmark in small scale
road networks – and a
key junction along the
route to Pages Wood

Harold Wood Station
– a prominent
landmark, highly
visible on the side of
road as it rises to
pass over the railway

Read up



towards end of
Hall Lane

towards
A127

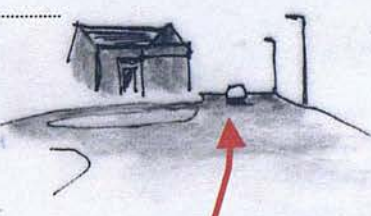
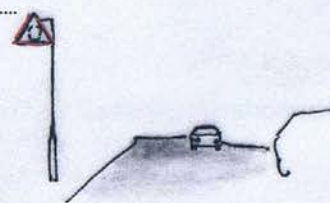
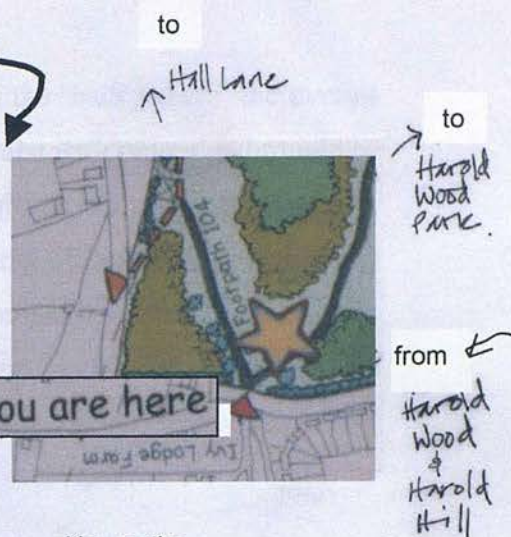
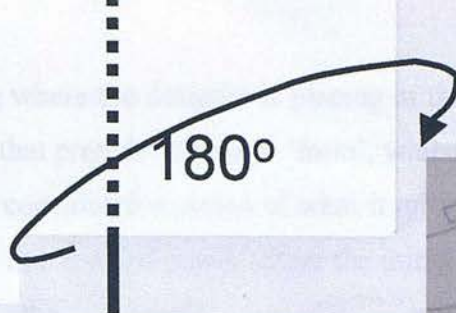
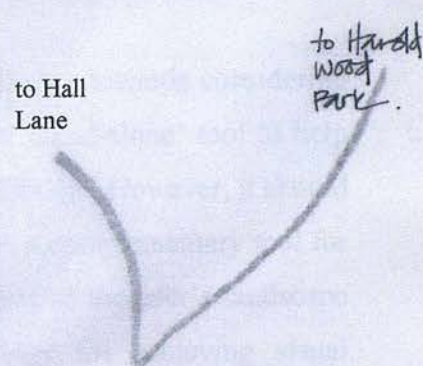
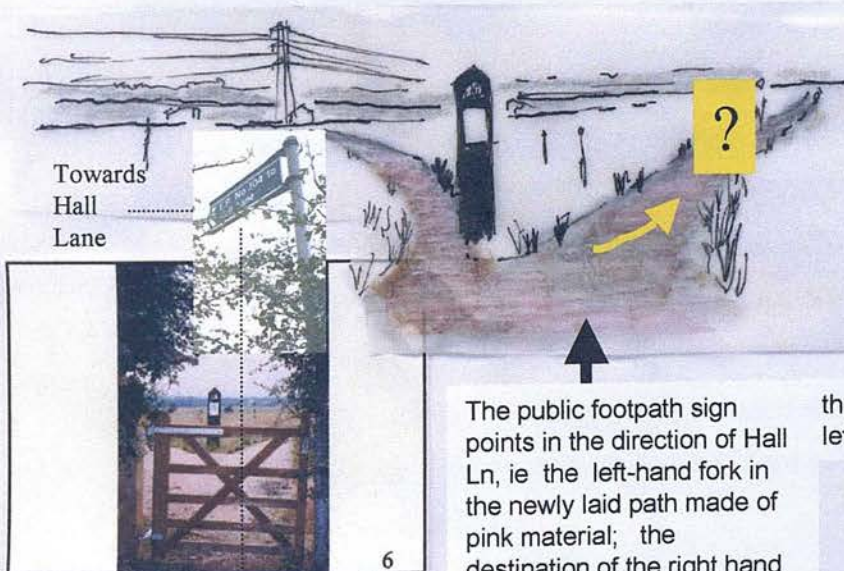


Plate 7.3.i: Route analysis of an approach to an amenity woodland site outside London. A scenario is enacted as if travelling towards <Pages Wood site> via <'Shepherds Hill/the end of Hall Lane'>.

if the map were turned around 180 degrees it would have the same orientation as the actual view point and therefore easier for the user to locate him/herself on the map and work out where all the paths lead to (which users said they did not understand).



(the paths which are pink on the ground are shown in black on the map)



The public footpath sign points in the direction of Hall Ln, ie the left-hand fork in the newly laid path made of pink material; the destination of the right hand path is not obvious unless you are able to decipher the site map provided (which is oriented upside down for the user) or unless you know the way.

there are basically two choices here: take the left or the right fork.

Plate 7.3.ii : Assessing the wayfinding 'usability' of a site on arrival <'at Pages Wood'> gate by Ivy Lodge Farm'>

This is a shift in thinking where the designer is placing in the 'background' the overall *spatial* qualities of place that provide structural 'form', whilst its 'content' is brought to the foreground: here it is considered in terms of what it *affords* the wayfinding user. It is this type of analysis, at this level of detail, where the utility of Dee's landscape model in relation to the Lynch model might be considered. '*Paths/edges/thresholds/foci/detail*' might be considered a sub-set of landscape elements that work against a background, structural form, which is explained by Lynch's model in terms of '*PATH/EDGE/LANDMARK/NODE/DISTRICT*'.

In the driving route example shown on **plate 7.3.i**, in the absence of directional signs, physical 'landmarks' such as a railway station building, or an electricity pylon might be considered 'foci' in the wayfinding experience. However, a 'landmark' in the wayfinding system could equally be road that is significant to the area and which is well signed such as 'Hall Lane' in the given example. In this instance the road would have to be considered a 'PATH/foci' to reflect its physical structure in relation to its function in the wayfinding system. Similarly, the sight of a forest-park like place with trees could constitute a 'foci' in the wayfinding system, and this could be described as 'DISTRICT/foci'. These type of 'descriptors' could be used as an expression of 'form and function' in the landscape.

It is notable that the discussion has moved beyond Space Syntax towards considering the use of integrated spatial-behaviour analysis for use as a 'stand-alone' tool to help designers generate and articulate 'system image' models for design. However, it should be considered in the context of discussion on space syntax as a complementary tool for use with such methods for providing a comprehensive picture of the user's landscape experience. Given the limitations of computer technology for achieving visual simulation of the experiential, topographical and detailed aspects of the environment, and, as discussed earlier in the thesis, the limitations of the interview survey, this would appear to have a useful role.

Before moving on to a discussion on the use of decision theory for enhanced predictive thinking in wayfinding design, it should be noted at this point that disabled people's needs are not specifically discussed in the thesis. In theory, spatial-behaviour analysis does have the potential to incorporate the whole of range of user types but this would entail a different *mode* of analysis with a different set of theoretical assumptions in mind. Thus the route analysis illustrated in **plates 7.3.i and 7.3.ii** could have been

conducted from the perspective of a wheelchair user, the visually impaired, or indeed a horserider, a cyclist, and so on, (whilst trying to find his/her way to and around a site on arrival), and although this would have produced a different set of data, the principles of spatial-behaviour theory are universal.

The discussion in this thesis aims to develop a set of basic principles and procedures for user needs assessment for application in any context of use, and in any mode of application, but for argument's sake the analysis takes place with the main able-bodied user group in mind. Whilst this thesis sought to develop explanatory theories and predictive models to help develop system images of place from the user's perspective, in any context of use, the main theoretical foundation is provided by wayfinding design and associated theories which explain exploratory behaviour in generic terms. The application of spatial-behaviour analysis across the spectrum of user needs assessment, would therefore have to infuse a wide range of theoretical models, according to individual research or design aims. This would require a highly flexible 'background' framework structure.

7.4 DECISION THEORY FOR ENVIRONMENTAL WAYFINDING

Passini is a key developer in providing the theory which can help designers generate system image models of the wayfinding experience. Passini has already been discussed in chapter 4 where his theory of 'imagined behaviour' was interlinked with 'imaginary wayfinding'. The potential of his theoretical explanations were highlighted for use in landscape design for helping the designer imagine in detail, in the mind or by 'living out' in the real world setting, a user's experience of finding their way through a place. Passini was quoted for stating that a designer, just as a wayfinding person walking through real space, produces an image of place. Whereas the utility of Passini's theories were considered earlier in relation to how they might help a designer navigate his/her way through the 'imagined' space he/she constructs through the design process, here the theory is discussed for its particular application in producing a system image model of a wayfinding system. The theoretical explanations are effectively the same, but the application of the theory in this instance is with a different intent in mind – here, Passini's theory is considered for its usefulness in helping the designer construct a predictive model for wayfinding design.

The method

Passini introduced a notation system for recording movement and *situating* decisions in space. This type of notation is highly 'selective' in the sense that it only records decisions related to wayfinding human/environment interactivity, ignoring sociological factors such as male/female and simply focussing on the wayfinding task. The notation is used in two levels of information: firstly, the decisions that lead directly to a 'behavioural action' shown in figure 7.4.i (a) or it can include a more comprehensive 'cognitive' notation illustrated in the same figure as (b).

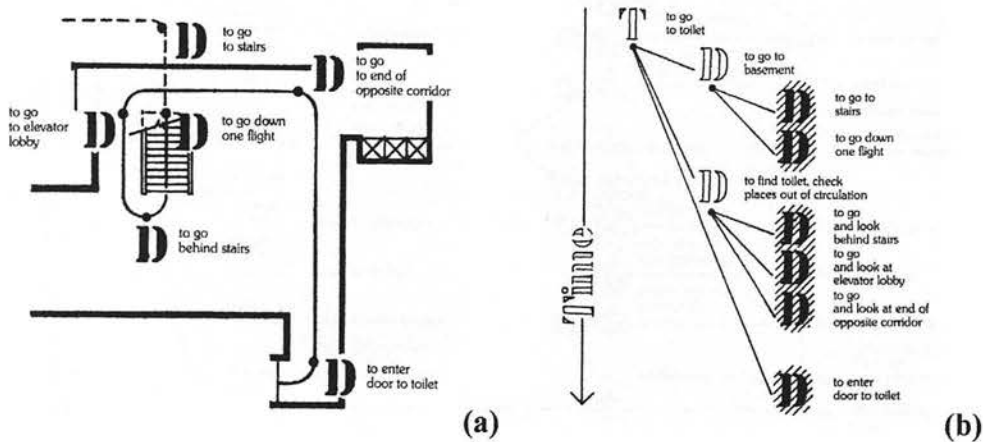


Figure 7. 4.i - Passini's notation system at work. (PASSINI, R, 1992, pp167-168)

Passini's design guidelines suggest the use of a structure diagram in combination with a sequence diagram to organise and code data (figure 7.4.ii below).¹¹ The first step involves determining the structural links among decisions. To do this entails identifying the key decisions which lead directly to behavioural actions - the lower order of decision making. The breakdown is necessary in order to arrive at this lower order of the decision making process. By Passini's approach this includes a set of coding rules, and here the approach becomes quite complex. In brief, a continuous numbering system is used to code the time sequence of statements using the coding model.

In the coding rules 'Is' refers to sensory information, 'Im' refers to memory information, 'D' is the decision and in the structure diagram 'T' refers to the decision where it becomes task and problem. The number system ('n') serves to locate elements (decision points and spatial information) in space. (See figure 7.4.iii below). The Passini approach works in conjunction with the behaviour circuit approach. Passini provides a way of systematically deconstructing 'the wayfinding problem' into sub-sets of problems where task, decision, image, sensory information, task and problem are

effectively quantified. The implication of the theory is that it provides a means of simulating, or testing design predictions in the designer's internal modelling process, before executing them through action (such as drawing).

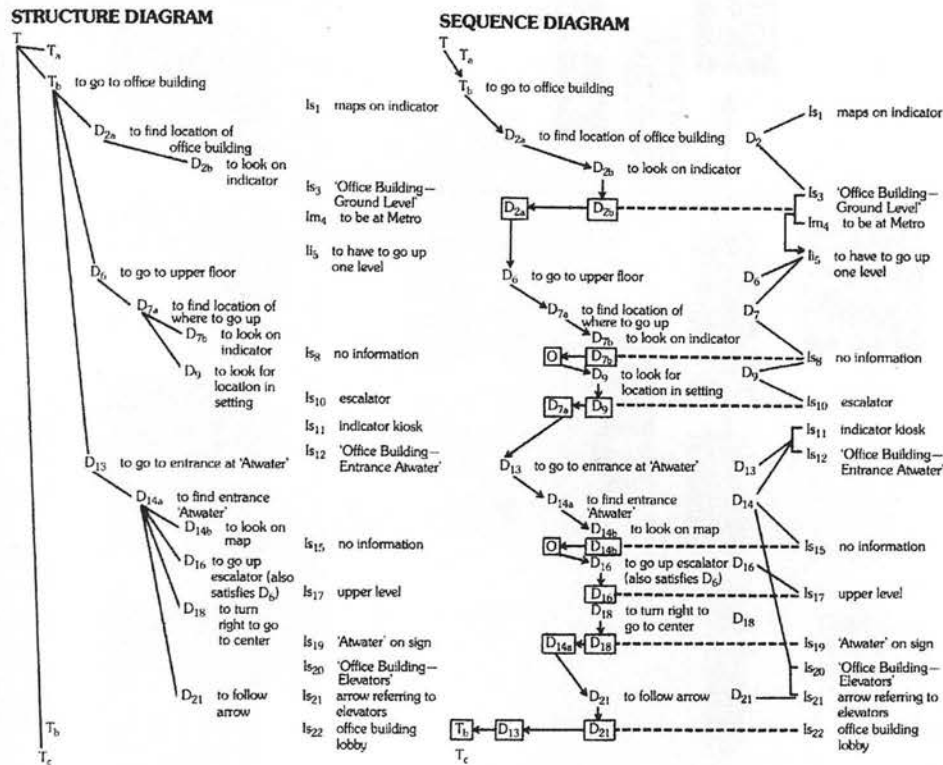


Figure 7.4.ii - Passini's structure and sequence diagrams. (PASSINI, R, 1992, p 219)

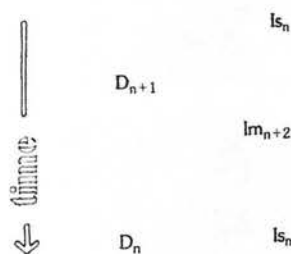


Figure 7.4.iii - Passini's coding rules. (PASSINI, R, 1992, p 213)

This thesis suggests that Passini's approach to modelling the wayfinding experience is overly complicated, statistical, abstract from 3-dimensional form, and its basic principles lost in technicality. The sequence diagram however may be considered useful as a way of structuring the information gathering process when analysing space for its wayfinding qualities. This potential was explored in the forest wayfinding study and is

described as follows.

An application of sequence diagramming

Plate 7.4 illustrates the use of a sequence diagram to assess consistency in the signage towards a forest site known as Afan Argoed, located in South Wales.

The analysis specifically assesses the informational content of the directional and reassurance signs which appear in the view from the road along one particular route towards site. This was the route most often cited by visitors in an interview survey, and the most integrated route as highlighted by the space syntax analysis. The spatial hierarchy of the generic wayfinding sequence (the wayfinding model presented earlier) is represented by the compartments across the page labelled “I, II, III and IV”. The analysis does not extend into the site (level IV), focussing here on the graphical information that is visible in the view from the road, along the road to site.

As already suggested, where there is a lack of consistency in the sign content, such as switches in style, colour, references to the site by different names, the journey becomes more complex because there arises a **lack of connectivity** between user expectation and information provision. The sequence diagram was used in an attempt to ‘measure’ the quality of a wayfinding system, using ‘informational content consistency’ as the main criteria and the method was termed ‘sign line’. In the example shown, the high number of branching points in the ‘sign line’ are indicative of a wayfinding system that is quite complicated – with many different points of potential confusion, whereas a site with good consistency (in terms informational content) would show a simple line with little branching. This method became incorporated into a ‘toolkit’ for site managers to self-assess their own wayfinding systems (this will be explained further in chapter 9).

7.5 SCENARIO ANALYSIS

The utility of scenario analysis has already been highlighted by this thesis as a way of structuring analysis of different scenarios of use in a given system. It was noted that scenario analysis is practically identical to, and yet different from, behaviour circuitory, as described earlier by Perin for use in physical space: whereas Perin’s original theory was highlighted for discovering the *existing* use of a space - scenario analysis, as structured using the path concept, emphasised a way of conceptualising how a space *might* be used. Scenario analysis has already been emphasised for its role in structuring spatial-behaviour analysis of the user’s experience in a task-based analysis approach, whereas this chapter provides a more indepth look at the theory and its application for constructing a system image model of place that can aide predictive thinking in design. This interlinks information gathering with knowledge generation for design.

Knowledge generation for design

In landscape architecture, predictions about the future are complicated by the fact the landscape is subject to change over time. This is as relevant in human ecological terms as it is in landscape ecology. Scenarios are more usually used in landscape architecture to envisage landscape ecological scenarios of change over time. However, the scenario concept can envisage scenarios of action in human ecological terms. For example, an extract from Laurie Olin's sketchbook in the re-design of Bryant Park, New York, shows how thinking in terms of scenarios of use (or 'what if?') in relation to detailed design alternatives, becomes incorporated into the design process (figure 7.5.i).

This project is a landmark case study in environment-behaviour research because of the integration of environment-behaviour research with the design process. The funders of the Bryant Park project employed William Whyte to advise on the project, and its designer Laurie Olin consciously aimed to give Whyte's ideas physical form. The approach was simple: Whyte identified the series of individual factors that *cause* a corresponding problem in the park eg drug trafficking in areas by iron fences or overgrown hedges, and identified what physical elements needed to be removed, added or changed to make positive *effect*.

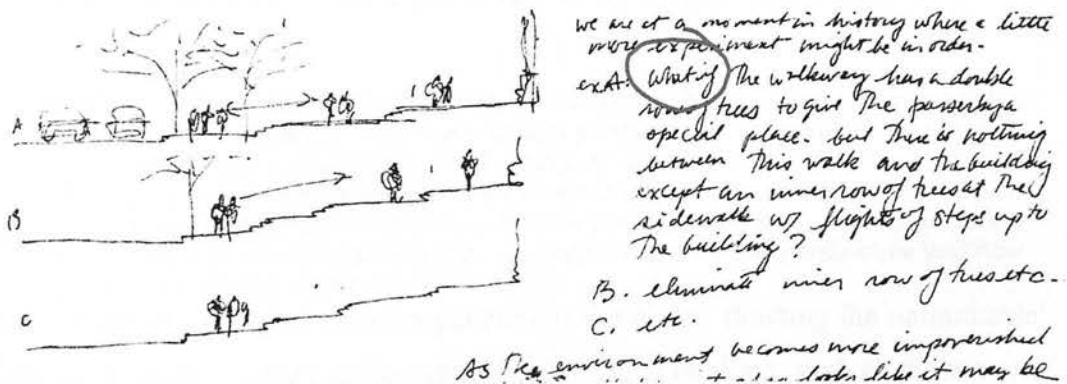


Figure 7.5.i - Notes from Laurie Olin's sketchbook: 'what if' scenarios. (THOMPSON, William J, 1997, p 13)

The consideration of alternatives in design, or any other sphere, is key to creative thinking^{12, 13}. In decision making accuracy in predictive outcomes is critical if designers are to become better at adequately responding to user needs, and to responding to the design problem and setting its parameters in the first instance. However, the accuracy of predictions depends on the type of knowledge used to structure the thinking process,

¹² op cit, HOGARTH, Robert, 1987

¹³ DE BONO, Edward, Practical Thinking. Jonathan Cape Ltd, London, 1971

and what informational input such thinking structures allow us to incorporate during [site] analysis, and thus, what predictive tools we use.

In terms of thinking structures, decision theorists provide key theories on how humans can make predictions. Scenario planning is the most important tool in the decision making toolbox in particular in the sphere of business management¹⁴, and has a potential role to play in landscape architecture. It is a tool which facilitates lateral thinking, as a way to identifying threats and opportunities that flow from decisions.

Scenario planning

Scenario planning was invented by Herman Kahn the nuclear strategist and futurist who apparently borrowed the term from Hollywood: it originally meant a detailed outline for the plot of a future film.¹⁵ The point of its application was in fact not to make accurate predictions but to come up with a 'story' that highlights the likely outcomes of particular decision paths.

Scenario planning is about living with ambiguity. Hodgson¹⁶ suggests that if [decision makers] can look at their own issues and ambiguities and come up with scenarios which can be used to test ideas and decisions, then that is a very powerful tool:

"Scenarists like to emphasize uncertainty and ambiguity because it is in that area that their approach is different. But if you cannot predict anything about the future then even thinking about it would be futile. Fortunately, there is predictability around us as well as uncertainty. Scenarios should be as much about prediction as uncertainty... If we look at a new situation everything may look terribly ambiguous. The art is to find out how much of this ambiguity is due to ignorance and limited perspective and how much due to inherent uncertainty."¹⁷

In decision management scenario planning is a tool for 'thinking the unthinkable'. It previously tended to look at the macro-level scale of thinking, such as the economy of entire regions, and therefore it tended to remain out of mainstream thinking. However, it is now coming to the fore at all levels in the decision making across a variety of disciplines. The concept of scenario planning requires a shift in thinking that goes against traditional approaches to planning (or in the context of this thesis, design).

¹⁴ DEARLOVE, Des, Key Management Decisions. Tools and techniques of the executive decision-maker. FT Pitman Publishing, London 1998

¹⁵ op cit, DEARLOVE, Des, 1998, p 67

¹⁶ ibid

¹⁷ ibid, p 69

In the scenario planning approach you must be accept that you cannot predict the future. By accepting this, you are accepting that there is inherent uncertainty in the decision making process. However, the philosophy behind scenario planning is that by this approach one can actually be more accurate, not less accurate, in making predictions. This is because if we were to assume that we *can* accurately predict the future, we are closing our minds off to alternative choice options, whereas by adopting this 'humble' approach we open our minds up to possibilities:

"Once you accept that you can't predict the future, then you can consider alternative scenarios. You start to see the need for what we call 'multi-future thinking' ..."¹⁸

As highlighted earlier, humans are not designed through evolution to evaluate probabilities carefully. We are none the less constantly making predictions we claim are accurate. Hogarth highlights the importance of emphasising that predictive judgements are made for purposes of decision.¹⁹ Thus in the context of the design process, designers are making predictive judgements which affect the design decisions executed. In developing predictions we normally make a series of inferences from a set of premises (assumptions) based on some model or hypothesis about the way the world is. Whereas in the research situation these may be 'tested', in landscape design, which is not generally taught in relation to probability theory for decision making, our 'predictions' are in fact no more than 'conjectures'.

Decision theorists highlight that the human brain is inadequate in carrying out calculations that are beyond our immediate powers of intuition, because there is inherent lack of rigour in our 'natural' thinking by which we jump to conclusions, and identify rules of thumb that suffice for everyday purposes as quickly as possible. Thus, according to Hogarth²⁰, humans are 'hopelessly inefficient' when it comes detailed analysis in the 'natural' set up where we are conducting analysis in a world characterised by uncertainty and ambiguity.

Creative thinking for predictive design

The importance of creativity in decision making is that if there are no alternatives identified (or scenarios envisaged) there is no choice, and this 'limits' the person's ability a) to structure the problem in the first instance, and b) identify and explore the

¹⁸ op cit, DEARLOVE, Des, 1998, p 68

¹⁹ HOGARTH, Robert, *Judgement and Choice. The Psychology of Decision*, 2nd Ed, John Wiley & Sons Ltd, UK, 1987

²⁰ ibid

issues sufficiently enough to make appropriate final decisions. Thus, it is one thing to identify the existence of a problem, but quite another to understand the specific nature of the problem. The choice alternatives can be broken down and analysed at different levels of detail. These are often conceptualised by decision theorists as decision tree diagrams. In his 'decision-maker's tool box' Dearlove²¹ illustrates how the implications of a decision may be understood using such a diagram (figure 7.5.ii). In the decision tree, in this field, based on the same principles that Passini used the decision tree as 'structure' and 'sequence' diagrams, decisions become set out as alternative courses of action and each alternative become assigned in terms of probabilities (the likelihood of events) towards establishing likely outcomes. Thus 'decision', 'probability' and 'outcome' are the key concepts for scenario planning:

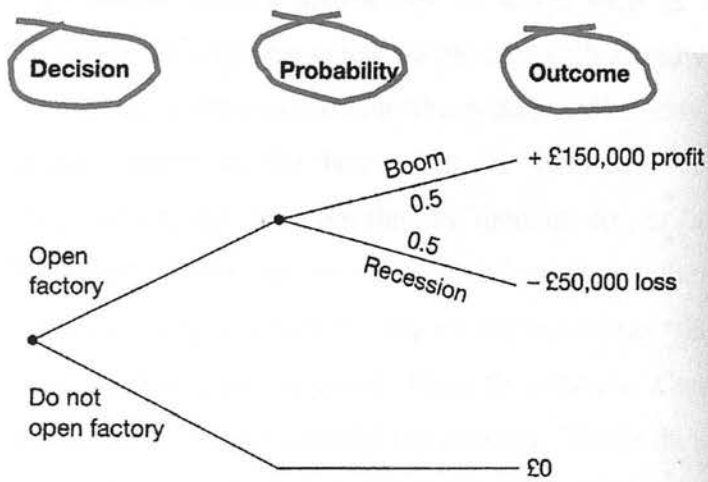


Figure 7.5.ii - The Decision Tree diagram. (DEARLOVE, Des, 1998, p 54)

The Kaplans' exploration and understanding matrix model was founded on an original theory that the human brain processes information and we 'find our way' through it, organise it and gain access to it *internally*, in much the same way as we finding our way about the physical environment *externally*. Their original model stated that firstly we must identify our current situation, secondly we make predictions about possible future situations, thirdly we carry out quick evaluations as to 'whether it will be good or bad' and finally we must consider some possible courses of action, or else we become lost in thought.²² It is the second stage that is critical when decision making for design, where we make predictions about the range of future possibilities. The key question emerging at this stage of the analysis is 'what is likely to happen next'. This enables us to make

²¹ op cit, DEARLOVE, Des, 1998, pp 54/55

²² DOWNS, Roger, M and STEA, David, *Image and Environment. Cognitive Mapping and Spatial Behaviour*. Aldine Publishing Company, Chicago, 1973

predictions. The effectiveness of scenario analysis however, is dependent on how it used to gather information.

Information gathering

The scenario²³ concept can be used as an ordering tool for focussing and structuring a user requirements survey.²⁴ Scenarios describe an anticipated or a desired use of a system and provide the 'units' for analysis.

In the human-computer interaction (HCI) field, scenarios are 'described' and used to focus a survey. Earlier, the 'path concept' was identified as a commonly used tool in such human-centred approaches to design such as where it is used to analyse the 'usability' of a system where no physical path actually exists. Thus, the survey focuses on the user's interaction with 'the system'. This may use observation or role-play, but usually refers to the latter. In the landscape context, route scenarios such as 'approaching the site from the M4, junction 40', or 'approaching via Aberfoyle' might be identified and used to structure information gathering. On site, however, paths are not necessarily structured by the parameters of, say 'the M4', or 'Hall Lane', and thus 'a path' must be conceptualised. Here, for example, a scenario of 'finding the toilets from the car park' would structure the analysis. This is an approach commonly used in retail and marketing research studies where it is termed the 'mystery shopper approach.'

The scenario should be used to structure, or focus, the analysis on site because once drivers are off the road the users may carry out any number of activities, and unless a particular scenario is selected, observation becomes unfocussed and so lacking in meaning. Thus, the process of describing scenarios forces the researcher to focus on the sequence of minute user/environment interactions required in order to identify what helps or hinders the user to accomplish a particular task.

Lynch, together with Norberg-Schulz, suggest that the 'path' is the most important of the basic landscape elements since it links all parts together. However, 'the path' in behavioural terms may not necessarily be physically structured path, for in spatial-

²³ The use of scenarios in this sense is not to be confused with the more conventional use of 'scenarios' in landscape architecture (and forestry) where it is used as a means of anticipating future changes in *physical* appearance. In this study it is used as a technique for identifying user requirements.

²⁴ GOUGH, P, FODEMSKI, F, HIGGINS, S, RAY, S., "Scenarios - an Industrial Case Study and Hypermedia Enhancements", *Proceedings of the Second IEEE International Symposium on Requirements Engineering*, York, England, March, 1995, 10-17.

behaviour theory the path constructs itself through the way people use the environment setting. For example 'getting from the car park to the toilets' at a forest site. Path as a *concept* in scenario analysis links all parts of an activity as a series of events along a



Figure 7.5.iii - 'Events along a path'. (NORBERG-SCHULZ, Christian, 1971, p 22)

path. In other words, 'the scenario' becomes the unit of analysis.

The acting out of scenarios identifies the experiential factors that structure the experience, spatial-behavioural information about the landscape setting is *generated* in the form of cause-and-effect factors that help, or hinder the user in accomplishing the task and thus helps the designers identify 'problems'

and 'opportunities' which translate into ideas for design.

Passini's basic model, which may be translated for use in the scenario analysis approach, can be used to test the individual components of a design proposal in three- and four-dimensions in a 'real' or bodily way, even when it is not possible to revisit the project site because it is too far away from the design office, or where the site is an empty space. For example if a designer who is based in Edinburgh, is trying to design a walking route down from the Alhambra palace in Granada (Southern Spain). Taking this example, if the designer's particular intent is to create an experience that helps 'outsider' tourists build up a picture of the layout of the town below on their way down from the castle, (for example through the use of viewing points at strategic points together with appropriate interpretation boards), she can identify a 'typology of use' that exists in Edinburgh not simply because the arrangement is similar – that is 'fortress-type city', but because she can observe users operating in a similar situation where there is also lack of navigation-based interpretation available for use to visitors attempting to walk from the castle, down the side of the hill, to the town. Ideally, role-play would occur where such a place exists where there is good provision made for navigation. Such observations enable us to compare 'what is happening' with 'what we want to happen'. This is 'evaluation-in-action'.

Using role play in combination with observation, detailed analysis can reveal factors that become incorporated into the design response. For example, the points where information is most needed as evidenced by users seen asking for help around the castle area as to where a descending path leads to, and then, as regards the users who do

attempt to find their way down, where suitable points arise for interpretation, for example, where users feel *naturally* compelled to stop, look, point and discuss the town laid out in front of them.

The use of comparative analysis is very much a part of landscape thinking, but should perhaps be brought into greater consciousness. This was an approach that was originally emphasised for use in town planning by Geddes who described his comparison of urban-geographical structures of Athens and Edinburgh (illustrated in figure 7.5.iv).

However, the comparative analysis this thesis emphasises is more of the 'side view' approach, than the 'master view', highlighting a dynamic approach which conducts a step-by-step task analysis of an experience, rather than a static view. In this way, the

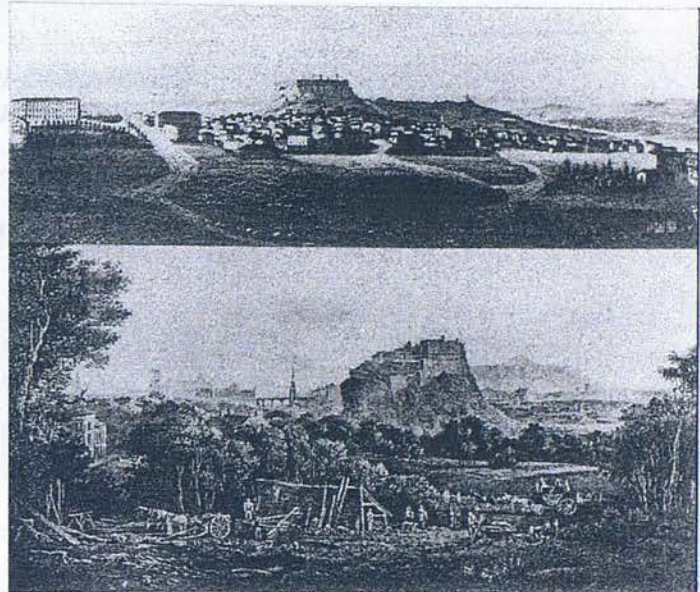


Figure 7.5.iv: Geddes' comparison of urban-geographical structures of Athens and Edinburgh as published in 1911. (WELTER, Volker, M, 2000, p 67)

design can evolve whilst moving between drawing board and real life even if the site is located in another country. By testing and re-testing the design and at the same time generating a 'system image' of place in this 'evaluation in action' approach, the method uses 'the self' to test the design. (See below).

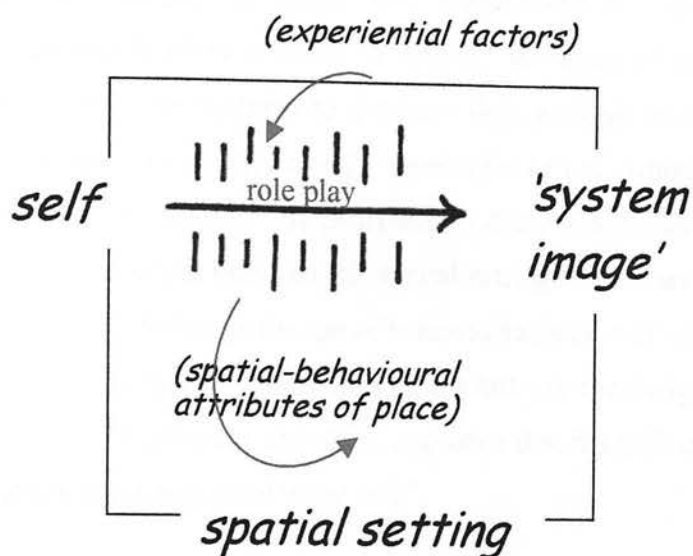


Figure 7.5.v: Using 'self' to generate a system image of place, in evaluation in action.

7.6 SUMMARY

This chapter reviewed three potential areas for introducing predictive thinking to integrated spatial-behaviour analysis, during site survey analysis. Firstly, space syntax was reviewed in terms of a theory and a method. The limitations and the potential of the method for application in the open landscape were noted. As a theory, its concept *connectivity* appeared to provide a useful core criteria for evaluating the quality of a wayfinding experience. The concept became useful when assessing wayfinding needs along a route to a forest site.

The second potential area for introducing predictive thinking was provided by Passini's wayfinding design guidelines. As a method, it was deemed of limited application because of its high level technicality. However, the basic application of the theory in its conceptual form, using 'the decision' as unit for analysis, together with its basic idea for structure and sequence diagrams, was emphasised as its most useful contribution.

The third area, scenario analysis, presented the most useful approach for introducing predictive thinking in design. This offered a philosophy, a theory, a method, a concept and a tool in one. Philosophically, it provides a way of 'thinking the unthinkable'; as a theory it provides a way of thinking about an environment-setting in terms of its

usability that is similar to the behaviour circuit approach, but simpler to describe; as method and a concept, its utility was emphasised for its ability to force the designer/researcher to *think* in terms of 'typical' scenarios of use and it was suggested that this would help the designer to *structure* their analysis around 'the route'. It was suggested that this would help *identify* 'typologies of use' which can help the designer narrow the scope of analysis. By analysing in detail a particular 'scenario of use' the cause and effect linkages between the spatial setting and behavioural response can be examined in detail. Although the use of scenario analysis was suggested for observation and role play, its utility was emphasised for the latter in the design process, for its utility in introducing an 'evaluation in action' approach that fits with design, in which system images of place are constructed using 'self'.

Finally, it was noted that the utility of the theories and knowledge derived out of this chapter for introducing predictive thinking to design in the site specific situation, is problematic because of the aspect of the wider gap problem which emphasises an inherent problem of knowledge integration. This is related to information gathering which is carried out in design and research spheres with different intents in mind.

Conclusion

In the site survey situation, the landscape provides the conditions to which the knowledge must fit, not the other way around. The landscape designer needs to be able to seek out and factor in knowledge from various analytical models as appropriate to the site specific situation, in order to improve their predictive capability. Meanwhile, the researcher is expected to generate knowledge that has general, universal application.

There is a need for a 'research-into-design' structure, that can be used interchangeably in research or design, as a knowledge generation/integration tool. Such a tool could be conceptualised in the form of a site survey method to link the situatedness of landscape design with the wider scope of research. Towards identifying what form this should take, the next chapter will firstly examine the different contexts research and design provide, highlighting 'scientific' concepts and theories that are 'design-like' and that therefore have a useful role in bridging the wider gap problem at a structural level.

Chapter 8:

THE APPLICABILITY OF RESEARCH METHODOLOGY TO DESIGN

8.1 INTRODUCTION

In this chapter, design and research methodological approaches, and the different contexts each provide, are compared and contrasted. Useful procedures and concepts are identified for application during site survey analysis for improved knowledge generation/integration in research *and* design studies.

8.2 'SCIENTIFIC' RESEARCH METHODOLOGY AND THE DESIGN PROCESS

The idea that the 'scientific' research process cannot be creative is a misconception. Perin once suggested that a social science research project can be more like design, than design itself. In support of this statement, de Bono has highlighted the fact that creative thinking is more related to knowledge and understanding, than something that is exclusive to artists and designers.

The lack of understanding and communication between research and design is complicated by the fact that there is no overall consensus about how to conceptualise the doing of research.¹ However, the differences mainly fall into two main traditions – one is the 'scientific' approach which starts with a theory, deduces an hypothesis and tests it (ie is hypothesis led), the other is an interpretive approach where theories and concepts arise or are 'induced' from the enquiry: for this reason it is often referred to as 'hypothesis generating'. It is in the reconciling of these two approaches that this thesis suggests lies the solution to the structural gap problem.

Researching in a 'designerly' way presents a problem in a PhD thesis. In the research world conventional approaches use methodologies that have been developed using the

¹ ROBSON, Colin, *Real World Research – A Resource for Social Scientists and Practitioner-Researchers*. Blackwell Publishers Ltd, Oxford, UK, 1993

'scientific' approach. The relevance of applying these methods in design oriented research has only relatively recently been questioned by professional researchers, and the associated problems articulated in published articles. Firstly, the conceptualisation of the design approach will be discussed.

Designerly thinking

Designers have a mistrust of methodologies. They are considered to be the antithesis of the intuitive and creative act of design:

"If you call it, 'It's a Good Idea To Do', I like it very much; if you call it a 'Method', I like it but I'm beginning to get turned off; if you call it a 'Methodology', I just don't want to talk about it.'"²

Nigel Cross notes the irony of this statement coming from the pioneering design methodologist Christopher Alexander. This statement however is a reflection of the change in understanding that came about on the nature of design – one which entailed a shift in view that design could be rationalised and systemised by the use of methodology, to a view which rejected the methodological approach. This is reflected in Alexander's work as it evolved from his systematic 'Notes on a synthesis of form' to the later 'Pattern Language'. Lynch's body of work too became characterised by a rejection of methodology. Instead Lynch favoured the idea that the designer should discover and use available techniques to formulate his own methodology.³ This view coincided with a general move towards a belief that the systematic approach is the 'enemy' of intuition⁴, and a general recognition that the use of the traditional 'scientific' research methodology in design is untenable since the design process *is* the methodology.

In the history of design methodology, trends can be traced from systematic design through to later mathematical and flow-chart type models, evolving towards a current thinking which adopts a philosophical and reflective approach to understanding the design process. When design methodologists realised that design problems were not easily subjected to systemization their attention turned instead to trying to understand

² ALEXANDER, 1971, paraphrased in Cross, Nigel (Ed), *Developments in Design Methodology*. John Wiley & Sons Ltd, UK, 1984

³ BANERJEE, Tridib, and SOUTHWORT, Martin, "City sense and city design, writings and projects of Kevin Lynch", *Landscape Journal*, v.15, no 2, Fall 1996, pp167-168

⁴ CROSS, Nigel (Ed), *Developments in Design Methodology*. John Wiley & Sons Ltd, UK, 1984

the complexity of particular kinds of problems.⁵ On realising the ‘ill-structuredness’ of design problems this instigated a different outlook: now design methodologists, (now more commonly termed design researchers) view ‘the methodology’ as simply a *means* of reflecting on their practise.

8.3 REFLECTING ON THE DESIGN PROCESS

Reflection on the design process is a useful starting point for trying to articulate and communicate what it is a particular design discipline does: in this way designers might better articulate how the information gathered during the site survey is used⁶. Such reflection would appear to provide a means of articulating how behavioural science and landscape design thinking might merge ‘in action’, as has been the approach taken in this thesis, but also its use is emphasised in the everyday situation in order to raise design consciousness of the limitations of our thinking when we do not ‘evaluate’ our design conjectures about how a space will be used ‘in action’:

“Reflection-in-action in a unique case may be generalised to other cases, not by giving rise to general principles, but by contributing the practitioner’s repertoire of exemplary themes from which, in the subsequent cases of his practice, he may compose new variations.”⁷

Zeisel suggests that describing the design process might help designers and teachers of design understand their own behaviour and so improve their design ability.⁸ Generally, the point of studying and describing the design process is to elicit methods and thus ‘demystify’ design⁹. Zeisel highlights a further reason for conducting such analysis as being useful where researchers and designers want to work together, and thus towards improving understanding and communication between the two spheres.

Cognitive design processes taking place in someone’s head cannot be directly observed. Therefore, elicitations of the design process are necessarily introspective and rely on personal experience. But, because it is inherently difficult to articulate one’s design process it is difficult to elicit in the first instance.

⁵ *ibid*, CROSS, Nigel (Ed), 1984

⁶ BODDINGTON, Anne, “ ‘Design’ as ‘process’ , Workshop, Proceedings, Conference on Design Education, The Lighthouse, Glasgow, 17-18 Sept 1999, Royal Incorporation of Architects in Scotland, /The Scottish Arts Council, Glasgow 1999 Year of Architecture and Design, p 55

⁷ SCHÖN, Donald, A, *Educating the reflective practitioner : toward a new design for teaching and learning in the professions*. Jossey-Bass, San Francisco, 1987, p 68

⁸ ZEISEL, John, *Inquiry by Design. Tools for Environment-Behavior Research*. Wadsworth, Cambridge University Press, 1984, UK, USA, Australia.

⁹ MOORE, Kathryn, “Demystifying the art of design”, *Environments BY DESIGN*, Volume 1, Number 1, January 1996, pp 69 –78

The idea of articulating the design process in the form of some kind of method appears alien to design thinking, whereas in a research sphere ‘the methodology’ is a necessary and integral aspect of the research process. In design the rejection of methodology presents a paradox: in order to study the design process (ie research it) a research methodology is needed. The use of ‘methodology’ enables a researcher to both study the process and to explain (or describe) it.

The use of ‘reflection-in-action’ is recognised for its utility in helping to break down the mystery surrounding design. This is particularly important in landscape architecture where the designer’s medium (the landscape) is inherently difficult to conceptualise and articulate. In addition, the problem in articulating the design process is compounded by the fact that the environmental designers operate in a world which nurtures a ‘silent code’ amongst educators and designers alike, one by which:

“...we know what design is, that we are bound together by design, that we understand its centrality and importance in what often appear to be disparate acts that we perform daily, and loosely term design and its processes and practices.”¹⁰

In addition to the silent code in design, there are the effects of the ‘hidden curriculum’ in education. This comprises the “unstated values, attitudes, and norms which stem tacitly from the social relations of the school and classroom as well as the content of the course”.¹¹ In her examination of the design studio, Marcella Eaton suggests the effects of the hidden curriculum are potentially very damaging to students. The implication is that knowledge transmitted through the ‘design’ represents a certain view of reality and that this sustains the interests of certain groups over others. Eaton suggests that the social relationship between the school, classroom and course content should be exposed to the student for the benefit not only of their own development but that of the school’s. The problem is a studio master may not be consciously aware of his/her prejudices and the effects of these on students. In the context of the problem explored in this thesis, the implication of the hidden curriculum is that a studio master who does not ‘see’ the value of behavioural observation in design will prejudice – consciously or not - the development of the curriculum and the students’ own development of social consciousness in [landscape] design.

¹⁰ op cit, BODDINGTON, Anne, 1999, p 54

Method mapping

Many writers have attempted to 'chart' a route through the design process from beginning to end in the form of 'maps'.¹² The general idea is that the design process consists of a sequence of 'distinct and identifiable activities' which occur in some 'predictable and identifiable logic order'.¹³ According to Lawson, it seems logical that the designer must do a number of things in a certain order, to progress from the initial stages of 'getting' a problem to the final stages of defining a solution. In landscape architecture, the survey-analysis-design sequence has traditionally been considered a generic approach to design, stemming from the type of thinking that produced the method map illustrated in figure 8.3.i below. This illustrates a map of the design process according a 'plan of work' conceptualised by the RIBA in 1965.

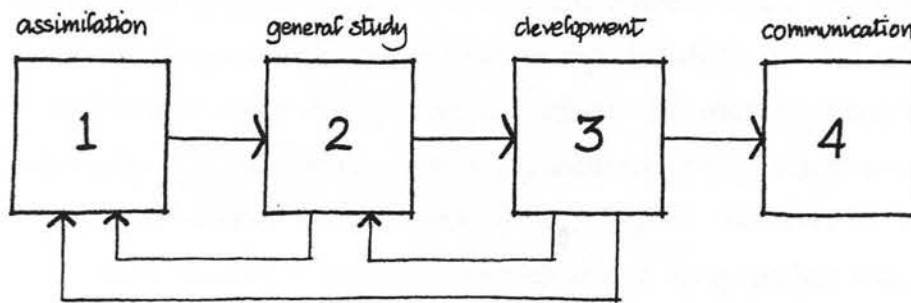


Figure 8.3.i: A 'map' of the design process according to the RIBA 'plan of work', 1965 (LAWSON, B, 1999, p 33)

The above map represents the following four phases:

Phase 1: assimilation – the accumulation and order of general information and information specifically related to the problem in hand;

Phase 2: general study – the investigation of the nature of the problem. the investigation of the possible solutions or means of solution;

Phase 3: development – the development and refinement of one or more of the tentative solutions isolated during phase 2; and

¹¹ DUTTON, Thomas, 'The hidden curriculum and the design studio', 1991, in: EATON, Marcella, "Philosophy and Design in Landscape Architecture", PhD thesis, Edinburgh College of Art, Heriot Watt University, July 1997

¹² LAWSON, Bryan, How designers think: the design process demystified – completely revised. 3rd edition, Oxford Architectural Press, Oxford, 1999, p 31

¹³ *ibid*

Phase 4: communication – the communication of one or more solutions to people inside or outside the design team.

However, Lawson suggests that the design process rarely goes as smoothly as such maps suggest and in fact the reality is much more confused. Lawson suggests that the design process is non-linear and therefore such maps are neither accurate nor helpful. In general terms, modern thinking on the design process suggests problems and solutions emerge together, in which there is a cyclical process at work. At the same time it is acknowledged that design is directional, that there is a beginning and end and that the designer follows a sequence of steps to keep the process moving forward.

The design process is simultaneously sequential and cyclical. In environmental design, Zeisel suggests the process is “an ordered process in which specific activities are loosely organised to make decisions about changing the physical world to achieve identifiable goals.”¹⁴ The problem is, no single sequence of steps can be prescribed for the designer to follow since this is the creative process itself. However, Zeisel suggests that certain characteristics of design exist which help in understanding what designers do, and thereby helping understand more about the process.

Design characteristics

The key characteristics of design described by Zeisel that are of interest to this thesis, are the interrelated activities he describes as ‘imaging’, ‘presenting’ and ‘testing’. These have a role to play in using and shaping available ‘information’ which in turn comes in two forms – ‘image’ and ‘test’ information. The way in which the different types of design activity operate in relation to the two types of information in the sequential/cyclical manner of design, is represented in the diagram in figure 8.3.ii.

Some brief definitions of Zeisel’s characteristics of design are provided as follows (as derived from Zeisel’s own text)¹⁵:

A Design activities

Design is a complex activity interconnecting three constituent activities:

¹⁴ op cit, ZEISEL, John, 1984, p 5

¹⁵ ibid

- 1 'imaging' – the ability to go beyond the information given; seeing something
where nothing seems to have been before; an internal process of forming a
mental image that becomes externalised through 'presenting';

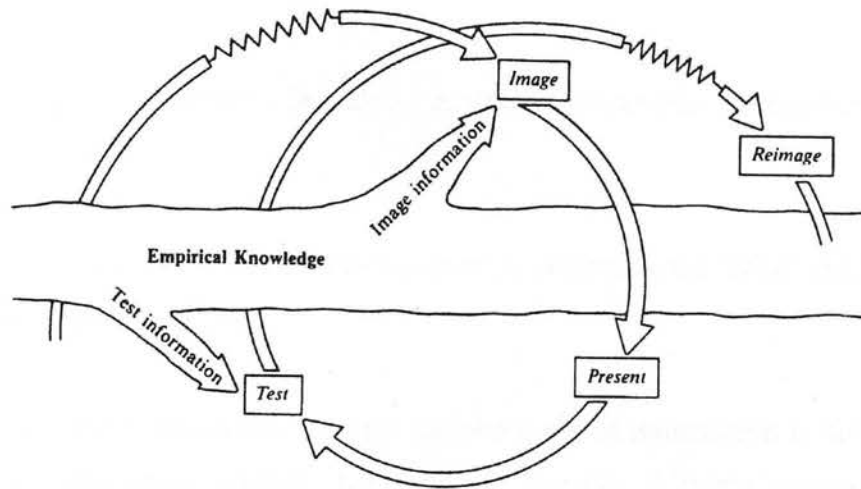


Figure 8.3.ii: The use of information in the design process. (ZEISEL, 1984, p 10)

- 2 'presenting' – externalising and communicating images through the sketch, plan, model-making, photographs; the presenting of ideas to make them visible so that they and others can use and develop them; the experienced designer recognises that such presentations will be returned to with a fresh eye to evaluate and improve it;
- 3 'testing' – this may occur in a variety of forms such as an appraisal, criticism, comparison, reflection, review; after presenting a design idea in whatever form, designers step back with a critical eye and examine their products; essentially it entails comparing tentative presentations against an array of information. Testing is backward and forward looking at the same time: it is backward to determine how good a tentative product is and forward to refine the image being developed in order to modify the next presentation; thus testing is feed-back and feed-forward process, both adjusting the developing design product in backward reflection but also it prepares the way for the next creative leap (indicated in Zeisel's diagram as 're-image').

B Two types of information

Information is used in a twofold way: 1) heuristically [to help generate conjectures] and as a catalyst for ‘imaging’, and 2) as a body of knowledge for ‘testing’. Designers define problems that require them to add to what they know. Gaps in knowledge may be specific, or general:

1 ‘image’ information – provides a general understanding of important issues and of physical ideas;

2 ‘test’ information – is directly pertinent to evaluating the ‘good’ and ‘bad’ points of a given ‘hypothesis design’.

Notably, the above distinction between the two types of information is not necessarily related to information content, but rather it clarifies different *purposes* that the information serves. This provides a helpful distinction towards conceptualising a ‘research-into-design’ method. In Zeisel’s diagram the core knowledge base from which image and test information is derived is described as *empirical* because it is a source for basic cognitive design decisions. The implication of this is that this knowledge base constitutes a combination of ‘givens’ (including the deeply embedded ideals alluded to earlier in this thesis) and information that is ‘acquired’: the designer makes deliberate and conscious effort to seek out new knowledge during the design process.

It is notable that image information can be used to convey a mood or a feeling of some environment, but it cannot be used to evaluate specifics of a design concept.¹⁶ Although both image and test information are drawn from the same body of knowledge, according to Zeisel, the ‘test’ type of information is used to evaluate specific design alternatives. However, in the context of design it is difficult to see such a clear separation: for example in the context of landscape architecture the designer might explore various options for an outdoor step or ramp design towards addressing a problem of connecting levels. Such information may derive from a variety of sources through real life examples, design magazines, or technical construction manuals and different solutions will be considered and ‘tested’ towards reaching a possible design outcome. However, the real testing’ could only take place ‘bodily’ as suggested by the use of the behaviour

circuit/scenario analysis approach when using role-play to ‘act out’ an imagined design proposal in real space – in its specific detail.



Figure 8.3.iii - Role-playing the user's experience at a woodland amenity site near London. (Photo by author).

In Zeisel's description of the design process he refers to the use of comparison in the design evaluation process. The use of comparison however is not an activity which is exclusive to design, it is the way humans make sense of the world in general. Psychologists explain the process as being related to the way the human brain works in ‘binary distinctions’¹⁷. This is the process by which humans perceive similarity between at least two events in order to distinguish one ‘thing’, or ‘incident’, from another. Notably, we distinguish things/incidents as being the same or different to other things/incidents, *relative* to those already in the knowledge base. This sets up a system of compartments in the brain by which we anticipate incidents relative to what we have known before.

Comparing incident to incident allows data to be classified by similarities and differences.¹⁸ However, during the process of organising and cataloguing information, or data, as during a qualitative research study, according to Strauss and Corbin, there are times when we come across an incident where we are stumped in finding its significance or meaning and therefore we do not know how to name or classify it. The reason why this occurs is that we cannot identify, or grasp, an incident's properties or dimensions either because they are not in the data, or because they are there but we are not sensitive enough to be able to recognise them. At these times, state Strauss and

¹⁶ op cit, ZEISEL, John, 1984

¹⁷ KELLY, G. A., *The Psychology of Personal Constructs*. Norton, New York, 1955

¹⁸ STRAUSS, Anselm, CORBIN, Juliet, *Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory*. 2nd Ed, Sage Publications Inc, USA, 1998

Corbin, we turn to 'theoretical comparisons'.

Theoretical comparisons

When thinking in terms of comparisons humans make use of metaphors and similes when speaking. Humans use these techniques to clarify and increase understanding. For example, in the context of landscape design, a design student might describe his/her design for a mixed use cycle/pedestrian link as 'like a boulevard' or a mixed use outdoor space as 'like a village green', and conjure up an image for others that may not help understand the specifics, but rather a mood, a tone, or atmosphere.

It is only when this type of comparative analysis is taken to greater detail where the 'properties' and 'dimensions' of an incident/event/object/thing are analysed, that this leads to the development of theory¹⁹. In everyday life people do not invent the world anew each time, rather they draw on what they know to help understand what they do not know. Using comparisons when we are confused or stuck about the meaning of an incident/event in the data helps us think about them in different ways: using comparisons brings out properties which in turn can be used to examine the incident/event/object in the data:

"The specific incidents, objects, or actions that we use when making our theoretical comparisons can be derived from the literature and experience. It is not that we use experience or literature as data but rather that we use the properties and dimensions derived from the comparative incidents to examine the data in front of us. ...Theoretical comparisons are tools (a list of properties) for looking at something somewhat objectively rather than naming or classifying without a thorough examination of the object at the property and dimensional levels."²⁰

Thus, because details are not always evident to the 'naked' eye, there are times when we have to stand back and ask 'what is this?'. It is in the asking of this question that, according to Strauss and Corbin, we begin (albeit unconsciously) to draw on properties from what we *do* know, to make comparisons. On the use of behavioural observation in environmental design, Cooper-Marcus/Francis suggested that the comparative approach is important in highlighting key design elements and challenging assumptions that observed use in any one setting is "typical"²¹.

¹⁹ op cit, STRAUSS, Anselm, CORBIN, Juliet, 1998

²⁰ ibid, p 80

²¹ COOPER MARCUS Clare, and FRANCIS, Carolyn (eds), *People Places*. 2nd Ed, John Wiley & Sons, Inc, USA and Canada, 1998, p 346

Towards generating useful theory for universal application in design, as should be the imperative of environment-behaviour research, this thesis emphasises the need for generating new theory which can help designers generate 'system images' of place with a degree of accuracy. Elizabeth Meyer was cited earlier for emphasising the need for 'situated' landscape theory, and whilst this thesis has carried out its theoretical explorations in different spatial settings, it is situated in the context of the landscape experience in terms of wayfinding, exploring and other variations of the activity. Thus, its theory is situated in an experiential sense, as well as in a physical sense.

The 'situated' response

According to Meyer situated landscape theory must bridge, mediate and reconcile practice within the field of landscape architecture 'within the time frame known as modern'²²:

- landscape theory should 'bridge' or link with familiar categories. These are 'theories from within' which facilitate discourse and criticism from within the discipline;
- as a 'mediating' device, landscape theory should be an 'activity' by which new theories become constructed through design itself;
- the role of theory in 'reconciling' entails the joining or making compatible, two different pieces of work; and finally,
- new landscape theory must be 'modern'.

On the latter issue, is notable that the thesis emphasised earlier that the fundamental issue is not modernity, but rather quality²³. In generating theory that helps designers generate accurate 'system image' models, this should help designers make better provision for the user's landscape experience and thus improve environmental quality. The situated approach to generating bridging theory, as described by Meyer, implies moving from the specifics of a situation towards identifying generalisations, rather than the other way around. This is the inductive approach to theory building.

²² MEYER, Elizabeth 'Situating modern landscape Architecture', (1992) in: SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader*. University of Pennsylvania Press, USA, 2002

²³ WALKER, Peter, SIMO, Melanie, *Invisible Gardens. The Search for Modernism in the American Landscape*. MIT Press, USA, 1994

The inductive approach

The process of moving from the specific to the general is the inductive approach to theory building, and is distinct from the deductive approach which is the traditional approach to structuring 'scientific' research. By the inductive approach, theories are either deduced from logical assumptions, or they are generated from observation²⁴. By the 'constant comparison method', as described by Strauss and Corbin, data are compared continuously with other data to detect emerging categories and themes and to direct the data collection process.²⁵ It would appear to provide a useful approach towards generating situated theory, since the generation of concepts is at the very centre of the design process for initial problem setting, for information gathering and final shaping of the design 'idea'.

In a research sphere methods are organised according to whether they are applied for qualitative or quantitative research.

8.4 QUALITATIVE RESEARCH

Traditionally, in the research sphere, it is assumed that research is approached by adopting either a qualitative or a quantitative paradigm. However, the recent move is towards a fusion of the two. In the human sciences, in particular, the new way of thinking has generated an interest in contextualised research.

In the human sciences it is generally assumed that the researcher will take a particular approach and tailor methods as appropriate to suit a particular problem or research question.²⁶ The contextualised approach reconciles the so called 'quantity-quality debate'. In this debate, on the one hand, the quantitative paradigm is seen as the *sine qua non* of the natural sciences because it "renders theoretical concepts 'observable', manipulable and testable" leading to the development of abstract findings and laws²⁷, on the other hand, the qualitative paradigm facilitates a search for understandings and meanings in the context of life itself. Put more simply, quantitative research is generally associated with the testing of theories (or answering questions) whilst

²⁴ GLASER, B G and STRAUSS, A I., *The Discovery of Grounded Theory: Strategies for Qualitative Research*, New York, Aldine Publishing Company, 1967

²⁵ GLASER, B G, as quoted in: http://www.windsor.igs.net/~nhodgins/grounded_theory_research_design.html

²⁶ HENWOOD, Karen and PILGEON, Nick, "Grounded theory and psychological research", *The Psychologist*, March 1995 PP 115 - 118

²⁷ *ibid*, p 115

qualitative research is associated with the generation of theories (or asking questions).
28

However, the idea that the quantitative approach brings objectivity to research and can provide 'answers', is questionable. In his provocative article 'Theory: The necessary Evil'²⁹, Howard Becker suggests that there is no such thing as 'objective knowledge'. He suggests that quantitative research is no more than an 'insidious disguise for positivism and pseudo-objectivity' and asks (as a researcher) 'why don't we admit that what we do is just another kind of story, no better or worse than any other fiction?'³⁰ Nonetheless, a research approach must be defined in order for research to take place.

Qualitative research approaches

Research methods are generally selected according to the type of approach adopted, of which there is a broad range in qualitative research. These approaches are distinguished from 'quantitative' if they do not rely on statistics, counting and measuring³¹ and are generally described as 'interpretive'.

In an earlier chapter, this thesis highlighted the experiential paradigm as an area of landscape assessment and perception research method. By this approach the focus is not on human or landscape components but on 'the experience of their interaction'³². 'People' are not passive observers but are active participants and the landscape experience is explored phenomenologically or through art and literature.³³

To reconcile research and design thinking in the experiential approach, this thesis suggests a method is required which offers a high degree of flexibility in the approach – one which allows for a design response to situations arising during the site study - in the tradition of the interpretive/phenomenological perspective – and which at the same time occurs in an ongoing 'reflection-in-action' approach. In this way, such a method could serve the purpose of helping designers be more explicit about, and conscious of, their

²⁸ EVANS, Gary speaking at EDRA 32/2001, July 2001 in Edinburgh, Scotland

²⁹ BECKER, Howard, originally published in: FLINDERS, David J and MILLS, Geoffrey E (eds), *Theory and Concepts in Qualitative Research: Perspectives from the Field*, Teachers College Press, New York, 1993, pp. 218-229, (sourced through <http://www2.fmg.uva.nl/sociosite/topics/research.html> [2003])

³⁰ ibid

³¹ op cit, ROBSON, Colin, 1993

³² BECHTEL, Robert B, Robert W Marans, and William Michelson, eds, *Methods in environmental and behavioral research*. Van Nostrand Reinhold, New York, 1987

³³ ibid

own process towards achieving an evidence based approach to designing ‘with the user in mind’. At the same time, such a method might be used in the process of bridging research and design paradigms, towards helping researchers understand better the needs of designers.

8.5 TOWARDS A ‘RESEARCH-INTO-DESIGN’ SITE SURVEY METHOD

Contemporary thinking on the design process in landscape architecture, adopts a philosophical stance that aligns with the interpretive/phenomenological perspective, but at the same time recognises the utility of ‘methods’. The contemporary design thinker in landscape architecture, Christophe Girot, became interested in the use of methods and techniques that might help the designer to gain a more comprehensible understanding of a landscape site, in pursuit of gaining knowledge and understanding on how designers might act more ‘wisely’ and ‘knowledgeably’. The use of methods and techniques is particularly important in landscape architecture because, as Girot himself states, landscape designers tend to resort to intuition to explain where their knowledge comes from because the profession is lacking in theoretical underpinning.

Girot identifies a four stage ‘method’ which comprises the concepts of *landing*, *grounding*, *finding*, and *founding* which are intended to represent the design process. Girot’s method serves two purposes – it both explains a generic landscape design process and it provides for designers a means of improving on their understanding of both their own process and their medium (the landscape). The four processes operate in sequence in the sense that first impressions made in the beginning, when ‘landing’, only happen once, followed by ‘grounding’ that takes place as the designer unravels a site’s historical, cultural and physical layers, ‘finding’ new discoveries towards reaching final conclusions when information gathered is synthesised during the final ‘founding’ stage. At one level Girot provides a poetic description of the design process, on the other hand he provides a useful protocol for structuring the problem setting and information gathering process in landscape design.

This thesis suggests that Girot’s ‘method’ provides a helpful device for integrating and generating knowledge in *situated* landscape research and design studies. The framework combines reflective/interpretive response to place and thus might be useful for on the one hand introducing design thinking into research and on the other

introducing research thinking to design. Such a framework would have to be effective in: a) setting the ‘problem’ in the way that problems arise *naturally* in design practice; b) structuring, gathering and processing design-relevant information (or ‘data’); and c) shaping a design-relevant final research ‘product’, and/or findings that are in a usable form for design.

In a special edition of the journal ‘Design Studies’ Professor Nigel Cross questions the nature of what a PhD in design-research should entail³⁴. One of the most fundamental problems for a designer-researcher in applying scientific research methodologies is that ‘designerly’ ways of thinking do not fit well with the scientific approach. The reasons for this have been explored earlier in the thesis, where it was highlighted that the problem is related to the fact that the designer’s *way* is one in which images are formed in their mind’s eye, ideas are manipulated and evaluated as they are created. This is a process that occurs *internally* before, during and after *externalising* design ideas.

The interpretive perspective in research

The defining feature of the interpretive perspective in research is that theories and concepts tend to arise *from* the enquiry.³⁵ Thus, theories and concepts come after data collection, rather than before it, and as a consequence, the approach is often referred to as hypothesis generating as opposed to hypothesis testing. Also in this approach data collection and analysis are not rigidly separated. Data collection, analysis, results, and further data collection occurs in a cyclical process repeated several times and, just as in the design process, initial idea [theory] formulation is successively elaborated and checked as the process continues.

The main danger in the interpretive approach to research is that the concepts generated are grounded in the subjective response. As with all qualitative research, it may be described as research that is ‘designed in the doing’³⁶. The advantage, which is also a disadvantage, is that it leaves room for individual judgment and takes account of individual situations in detail and context, and consequently, states Becker, it is faulted for being all of those things.

³⁴ CROSS, Nigel, Editorial, *Design Studies*, vol 19, no 1, January 1998

³⁵ *op cit*, ROBSON, Colin, 1993

Referring specifically to education (but providing parallels with sociology and anthropology) Becker suggests that researchers are no longer sure, as they once were, that they are doing things the 'right way' and are questioning the traditional model of research thinking. Becker states that the conventional research model is philosophically unsound and in need of a serious rethink. This re-think was begun some time ago by Dewey, Schön and others who emphasise the phenomenological approach.

Phenomenology in research

Phenomenology offers a type of enquiry in which 'the self' and the subjective response [to place] structures the analytical, design and/or research process. Phenomenology provides an approach to the study of place which is applicable (and is applied) in both research and design spheres. It is founded in Heidegger's 'being-in-the-world' philosophy, and represents a call for 'a return to the world which precedes knowledge'.³⁷ Notably, this is the philosophical foundation to Christopher Alexander's work – the pioneer design methodologist – and indeed the approach adopted by this research thesis. Fundamental to the phenomenological approach is that "one cannot presuppose a world prior to our lived experience of it."³⁸ Ethnography and Grounded Theory Method are two research methods which are underpinned by the phenomenological approach.

A Ethnography

Ethnography is sometimes simply referred to as 'participant observation' because this is a method by which the researcher participates in the daily life of the people under study, either openly in the role of researcher or covertly in some disguised role. It is an observation based method and is traditionally the method of the anthropologist.

Ethnography is phenomenological in that it is characterised by open-ended questions and the use of multi-methods. A classic example is Whyte's (1955) study, *Street Corner Society*. Although the sociological approach is not appropriate in itself (because the designer is concerned with physical things) the open-ended questioning facilitates the inductive approach by which designers generate hypotheses, and test and re-test them in an 'evaluation in action' approach. The problem, as highlighted by Norman, is that the model used in the test/re-test process, has a tendency to reflect the designer's personal

³⁶ BECKER, Howard S, in: op cit, FLINDERS, David J, and MILLS, Geoffrey E, (Eds), 1993

³⁷ DOVEY, Kim, *Framing Places. Mediating Power in Built Form*. Spon Press, 1999

interpretation of place (ie, the designer's interpretation of the system image) whereas for effective 'evaluation-in-action' to take place a more objective view must be adopted but whilst accommodating the role of 'self' in the analytical process.

B Grounded theory approach

Grounded Theory approach offers a way of thinking about data that is both reflective and interpretive. It is, according to Strauss and Corbin, the most influential and widely used mode of carrying out qualitative research when generating theory is the researcher's principal aim³⁹. Robson states that qualitative research approaches which are 'reflective' – such as is offered by Grounded Theory – are approaches which defy systemization of their analytical process⁴⁰. In the context of the current need to devise a design compatible research method, this offers an appropriate direction.

In the introductory pages to their book on the Grounded Theory approach Strauss/Corbin state:

"We want [the researcher] to acquire a way of thinking about data and the world in which they live. We want them to question, to be able to easily move from what they see and hear and to raise that to the level of the abstract, and then to turn around again and move back to the data level. ... The importance of this methodology is that it provides a sense of vision, where it is that the analyst wants to go with the research. The technique and procedures (method), on the other hand, furnish the means for bringing that vision into reality."⁴¹

Grounded Theory approach, as a research methodology, is in fact a set of procedures and techniques that the researcher must apply in his/her *own way*, or in other words, it is a 'do-it-yourself methodology'⁴². This thesis seeks to identify, from grounded theory approach, useful concepts for generating a 'research-into-design' site survey method.

Useful concepts

Unlike a conventional research methodology Grounded Theory offers an approach, or a way of thinking, by which the research project is not framed by specific or 'closed' hypotheses, but instead the research questions are open-ended.

³⁸ op cit, DOVEY, Kim, 1999, p 39

³⁹ STRAUSS, Anselm, CORBIN, Juliet, (Eds) Grounded Theory in Practice. Sage Publications Inc, USA, 1997

⁴⁰ op cit, ROBSON, Colin, 1993

⁴¹ op cit, STRAUSS, Anselm, CORBIN, Juliet, 1998, p 8

⁴² GLASER, 1978, paraphrased by SAMIK-IBRAHIM, Rahmat M, 'Grounded Theory methodology as the research strategy for a developing country.' Forum Qualitative Sozialforschung/Forum: Qualitative Social Research [On-line Journal], 1(1) at: <http://qualitative-research.net/fqs>, January 2000

Strauss and Corbin describe Grounded Theory methodology as a particular 'style' of social research. For this thesis, like design, but *unlike* the traditional scientific approach, Grounded Theory offers a 'way of thinking' about data which uses 'the self' as instrument. Drawing on John Dewey's philosophy, as with Donald Schön's work, it recognises the limitations of the rationalist approach to the research inquiry which bypasses the initial stages of the process of enquiry at which stage the 'problematic situation' emerges. The utility of some of the concepts embodied in grounded theory which are relevant to a) problem setting, b) information gathering and c) knowledge generation, are highlighted as follows:

a) Problem setting:

By Dewey's thinking, the initial stages of an enquiry should be recognised as an important stage during which much reflection back and forth between the subject matter and 'the self' takes place. It identifies the importance of the human response to problems arising, recognising the 'error' of isolating this human response from knowledge building when in the pursuit of 'truth'.

In Dewey's view, traditional rational and empirical epistemologies have drawn too stark a distinction between thought, the domain of knowledge, and the world of fact to which thought (the self) was believed to exist separately from the outside world. Glaser and Strauss developed Grounded Theory out of a recognition of the fact that separating 'self' from the inquiry process, presented a very limited approach to knowledge building.

b) Information gathering:

Grounded Theory is said to be especially suitable for use in investigations in relatively uncharted water, or to gain a fresh perspective in a familiar situation.⁴³ It is both flexible and responsive since it allows for a high degree of interplay back and forth between practical and theoretical modes of enquiry allowing theory to be generated from the data in a mode of thinking which questions 'what is *really* going on?' The theories generated to explain the real-life goings-on, are thus generated from an understanding of a situation 'grounded' in the data. Thus, it is a way of thinking about

the data where theories, or hypotheses are derived from initial data gathering, which then shape the ongoing data gathering process.

c) Knowledge generation

Grounded theory approach is a way of thinking about data from life-based study in terms of *phenomena*. The process of naming phenomena allows theory to generate from the data, rather than the other way around. The conventional approach is a way in which researchers gather data to test a pre-defined theory, whereas Grounded Theory offers an approach which is essentially 'phenomenological'. Essentially Grounded Theory recognises the need to get out into the field to discover what is really going on and of the relevance of theory, grounded in data, to the development of a discipline.⁴⁴ In the 'messy', highly exploratory approach to research, Grounded Theory allows for greater analysis of problems and of information seeking in the pursuit of knowledge.

As described by Piantanida, Maria et al (and to paraphrase Schön), practitioners more typically operate in "the swampy lowlands of messy ambiguity, formulating courses of action as they engage in on-the-spot reflection"⁴⁵. In claiming grounded theory as a mode of inquiry within the practitioner's field, Piantanida et al stress its usefulness as an *interpretive* research tool which, combined with the use of 'reflection in action', generates self-understanding, brings tacit knowledge to light, recognises our taken-for-granted assumptions and for examining our range of meanings and thereby expanding our capacity to respond wisely in practice.

Another important factor to address in discussing the applicability of research methodology for design, is in dealing with the data.

8.6 DEALING WITH QUALITATIVE DATA

Miles⁴⁶ famously described qualitative data as an 'attractive nuisance'. Data overload is a constant danger at collection stage in qualitative research, and clear thinking on the

⁴³ SAMIK-IBRAHIM, Rahmat M, 'Grounded Theory methodology as the research strategy for a developing country.' Forum Qualitative Sozialforschung/Forum: Qualitative Social Research [On-line Journal], 1(1) at: <http://qualitative-research.net/fqs/>, January 2000

⁴⁴ op cit, STRAUSS, Anselm, CORBIN, Juliet, 1998

⁴⁵ PIANTANIDA, Maria et al, "Claiming Grounded Theory for Practice-based Dissertation Research. A Think Piece", University of Pittsburgh, Pennsylvania, Proceedings 2002 Conference on Interdisciplinary Qualitative Studies, Roundtable Discussion, January 3-5, 2002, Athens, Georgia, p 2

⁴⁶ MILES, 1979 in: op cit, ROBSON, Colin, 1993

part of the analyst is a central requirement for its analysis.⁴⁷ The major thrust of the analytic techniques for use during data collection in interpretive approaches, as with most qualitative approaches, is termed 'data reduction'. Decision theory helps in this respect.

Information gathering for decision making

In information gathering, whether in research or design, decision making is a key component from problem setting through to the final design or research 'product'. Decision making largely determines what information we gather to inform our process. Stephen Kaplan suggested that prediction, evaluation and action can in fact be subsumed under the concept of decision.⁴⁸ In order to make decisions we must also be able to make a variety of predictions about possible subsequent developments. In this respect, Kaplan suggested that we use our internal representation system (or, mental mapping faculties) to work through these predictions in terms of 'what is likely to happen next.'

To aid decision making in the environmental planning and design, Lynch proposed a 'strategy for action and analysis' using a series of questions to structure the information gathering process. The question formulating process was proposed for fitting studies to the context of issues. The decision theorist Hogarth conceptualised a decision analysis framework for problem structuring by a series of interrelated questions. He suggests asking 'key questions' which elaborate two central questions pertaining to *evaluative* and *predictive* dimensions of the process, that is 1) how much do you 'like' the consequences of different alternatives (are they good or bad?) and 2) what do you expect to happen?. In the design process this might be subsumed in 'evaluation in action'. (See figure 8.6.i and ii).

To the right of Hogarth's model (figure 8.6.i (b)) is a suggested simplification of the structure for conceptualising the sequential/cyclical nature of design and how problem setting, information gathering and knowledge integration and generation interlink.

⁴⁷ *ibid*

⁴⁸ KAPLAN, S, in: DOWNS, Roger, M and STEA, David, *Image and Environment. Cognitive Mapping and Spatial Behaviour*. Aldine Publishing Company, Chicago, 1973

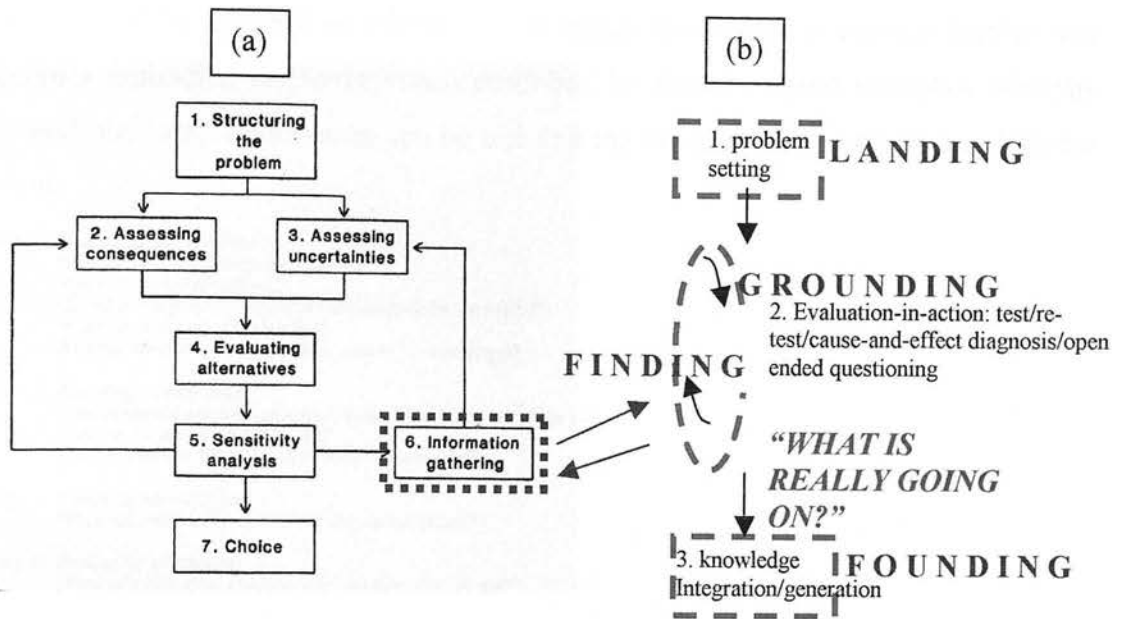


Figure 8.6.i - A decision analysis approach (a) Flow chart (HOGARTH, Robert, 1987, p 178); (b) A suggested 'action-and-analysis' variation of the model for design.

The overall model may be conceptualised in terms of three distinct activities with 'research-into-design' capabilities, (that is, can infuse the design process with 'knowledge' gained, in this instance, through techniques in spatial-behavioural observation), as represented by the red outline shapes in the diagram and labelled as:

1. problem setting; 2. evaluation-in-action; and 3. knowledge integration/generation. It is the middle part of the diagram which is considered crucial to integrating 'research' and 'design' thinking. Note that during the 'Grounding' phase of the design process *test-re-test/cause-and-effect diagnosis/ open-ended questioning* takes place in a cyclical feedback/feed-forward loop together with 'Finding'. Thus, this central area is an important information gathering phase. This is because initial impressions are further explored, new information is fed in, and, as explained by Zeisel, ideas are turned around as the design 'product' is returned to again and again in a test/re-test mode of practice. Consequently, this 'middle-ground' may be considered the 'thinking machine' to the whole process.

At the sixth level in Hogarth's original model, it is notable that information gathering (highlighted in figure 8.6.ii) occurs after 'assessing consequences', 'assessing uncertainties', 'evaluating alternatives' and 'sensitivity analysis', has been conducted. This is because the decision should be *sensitive* to lack of knowledge in relation to

specific aspects of the problem, but at the same time the preceding stages should narrow the scope of the information gathering. In design this occurs in cyclical fashion and becomes embodied in the approach described by Zeisel's spiral metaphor whereby 'image' and 'test' information can be one and the same but collected with a different *intent*.

- Step 1: Structuring the problem*
 - Who is (are) the decision maker(s)?
 - What are the alternatives?
 - On what dimensions should the alternatives be evaluated?
 - What are the key uncertainties?
 - At what level does the problem need to be structured?
- Step 2: Assessing consequences*
 - How adequate are the measures of the dimensions on which the alternatives are to be evaluated?
 - How should the different dimensions be weighted?
- Step 3: Assessing uncertainties*
 - What information is relevant to the uncertainties?
- Step 4: Evaluating alternatives*
 - What criterion (i.e. decision rule) do you wish to use?
- Step 5: Sensitivity analysis*
 - How wrong are the estimated consequences and uncertainties?
- Step 6: Information gathering*
 - What are the costs and benefits of securing additional information?
- Step 7: Choice*
 - Has there been sufficient analysis of the problem?
 - Which alternative has the greatest expected utility?

Figure 8.6.ii - Summary of key questions by steps in decision analysis (HOGARTH, Robert, 1987, p 184)

It is also notable that the seventh level 'choice' is 'has there been sufficient analysis of the problem?'. Hogarth states that if, as is invariably the case the answer is no, the consequences must be reassessed. The other aspect of 'choice' is the notion of there being alternatives. These, according to Hogarth's model, enable the decision maker to decide, finally, 'which alternative has the greatest expected utility?'. It was suggested in the last chapter that the lack of ability to think in terms of alternatives limits the person's ability to structure the problem in the first instance. It is here the designer has most potential in introducing rigour to the design process working with a variety of 'images' to work through a series of design options.

Sometimes design solutions are described as a research equivalent to the scientific hypothesis. The use of the 'hypothesis' in design is similar but different to research. Dunbar highlighted the danger of adopting an approach along the lines of Popper's philosophy which states that the scientific method is in some sense natural and that the designer's 'solutions in principle' could be paralleled with a researcher's working hypothesis. Although there is a similarity in the process of refining the hypotheses/conjectures, because the human brain is inadequate at making calculations

that are beyond our immediate powers of intuition, there is a lack of rigour in our 'natural' thinking by which we jump to conclusions as quickly as possible. Thus, Dunbar states, humans are 'hopelessly inefficient' when it comes to detailed analysis.

Schön highlighted an aspect of the research/design gap problem as being that researchers expect practitioners to be able to 'map' categories of applied science onto features of the practice situation. Given our limitations as human information processors, and given we operate in a world characterised by uncertainty and ambiguity, designers need robust thinking tools, such as these decision theorists provide, to help introduce rigour to the design process.

An essential aspect of information processing in both research and design spheres is its visual display.

Information gathering and visual display

Robson defines 'display' as the finding of methods which present the data in such a form that valid conclusions can be drawn.⁴⁹ This draws out the quantitative/qualitative debate.

Quantitative versus qualitative

In quantitative research, graphs, histograms, matrices, maps and charts and so on are integral to the research process, and the final communication of conclusions.

Strauss/Corbin highlight the fact that many researchers have long recognised that the two research paradigms of qualitative and quantitative research can be complementary⁵⁰. Although dogmatic positions in favour of one approach or the other persist, many have recognised that each can add something to the findings of a research project. It is not uncommon for some researchers to adopt one paradigm as a primary mode, and the other as supplementary, for example counting, measuring and statistics can supplement, extend or test ways of doing qualitative research. In the context of the current discussion, visual data may be used quantitatively as for example used by Lynch when mapping his 'composite sketch sequences', where he visually mapped the most often cited landmarks mentioned in interview analysis of people descriptions of their

⁴⁹ op cit, ROBSON, Colin, 1993

⁵⁰ op cit, STRAUSS, Anselm, CORBIN, Juliet, 1998

‘view from the road’ experiences and from which he generated his theory of ‘sequential form’, which this thesis suggested provides an explanation of the Gestalt in ‘experience and common movement’.

The creative use of quantitative research data is where some of the most important developments in knowledge have been made. The type of thinking which integrates data processing, the formation of ideas and graphical representation of ‘findings’ that would relate to landscape architectural thinking, has been examined by Edward Tufte in his book ‘Visual Explanations’.⁵¹ He suggests that the creation *and* display of innovative and reliable data, requires the adoption of a basic principle: to consider what forms of display are most likely to bring relevant data together in a way that will encourage the drawing of conclusions.

Creative thinking and visual display

Tufte establishes a link between creative thinking and visual representation. He examines the methods used by a variety of ‘creators’ and ‘discoverers’ who have represented, described and illustrated ideas and findings, and shows how their use of certain methods have, at the same time, constructed new knowledge. Tufte’s premise states that *those who discover an explanation are often those who construct its representation*. By way of example, in a fascinating study about John Snow’s discovery of the cause of the cholera epidemic in London in 1854, Tufte illustrates how a radical shift in thinking came about because of Snow’s particular approach to a study.

The cholera story illustrates the *qualitative* use of quantitative data. It also relates very well to the landscape process since the data processing method used by Snow entailed the mapping of incidences of Cholera on a street plan of London. Snow made a systematic survey of all incidences of cholera in a certain area of London, plotting all incidences in relation to the location of water pumps. Snow used this quantitative data in a qualitative way such that he could communicate, and therefore evidence, his theory about there being a connection between incidences of cholera and water sources.

In the map illustrated in figure 8.6.iii the yellow areas are the brewery and work house in which, despite their location in the middle of an area of cholera outbreak, the occupants of these buildings were largely unaffected. He explained this phenomenon,

and at the same time proved his theory, by establishing that the workhouse accommodated men who worked in the brewery and that these men drank beer, not water. In this way, Snow played a significant role in a shifting thinking about the way that Cholera spreads - as a water borne, not as an air borne, disease.

Jon Snow made a visual-spatial cause and effect link between the water source and cholera, and, critically, was able to successfully communicate this connection (his 'idea') in a way which evidenced the theory. This took some creative thinking. In light of Zeisel's explanation of how 'information' can be used in the design process with different intents for 'image' or 'test' purposes to explore conjectures (or in research terms, to test hypotheses) the gathering and processing of information for design purposes using the 'cause-and-effect' principle should be emphasised. This is an aspect of the overall interpretive/predictive approach to landscape design which this thesis argues for, which should embody an 'evaluation-in-action' approach.

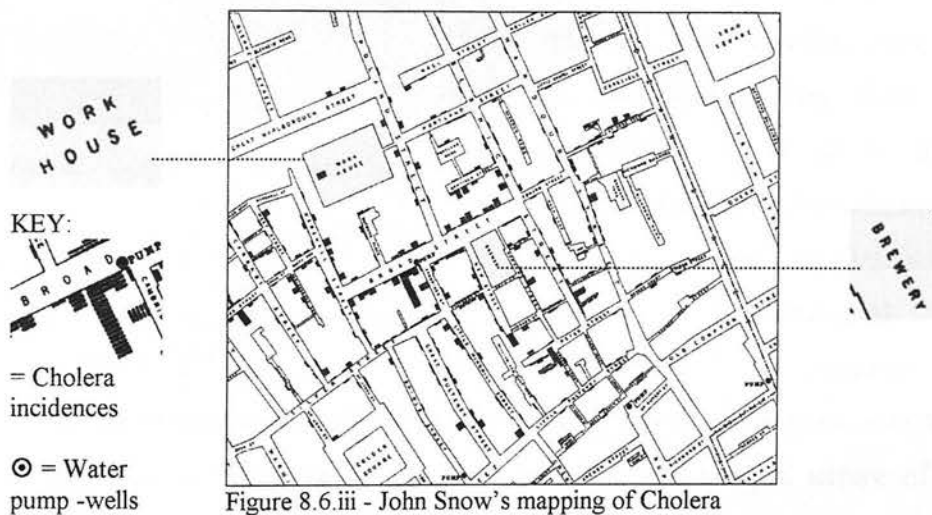


Figure 8.6.iii - John Snow's mapping of Cholera incidences (TUFTE, Edward, 1997, p 30)

Recent advances in computer technology have greatly enhanced possibilities for information processing and analysis and its visual display.

Computer technology

Geographic Information Systems (GIS) in particular has revolutionised spatial analysis in landscape design and planning. Using GIS, CAD or other graphic imaging software with GIS capability, it is possible to plot behavioural mappings in digital 'layers' of activity types, user groups and so on, and directly cross-reference them with text

⁵¹ TUFTE, Edward, *Visual Explanations. Images and Quantities, Evidence and Narrative*. Graphics Press, Connecticut, 1997

information put into a database. Sketch book images could also be input to add a 3-dimensional dimension to the dots in a way not dissimilar to hyperlinks created in web page technology. GIS in particular provides a highly interactive tool in this respect.

On the other hand, simple computer tools can be used to hyperlink images to reconstruct

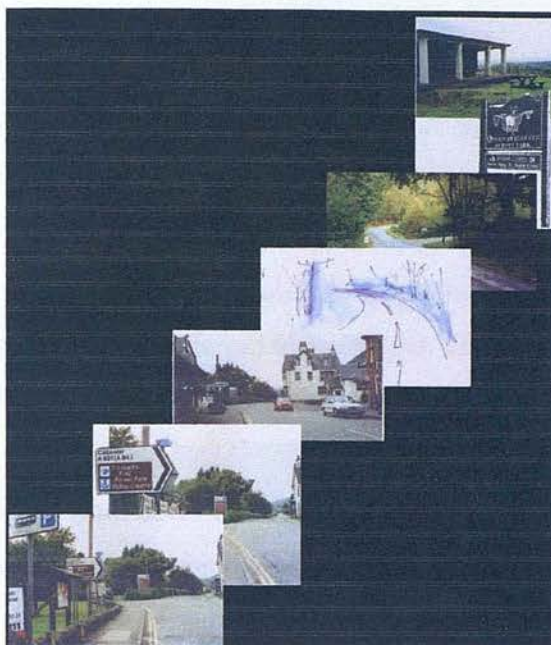


Figure 8.6.iv - using a web page tool to hyperlink images together to 'reconstruct' and reassess the landscape experience for a desk top analysis. This can however, equally be achieved in a basic powerpoint slideshow. (Extract from forest wayfinding analysis produced for FINDLAY, Dr C, SOUTHWELL, K, et al 2001)

'reality' for testing out design solutions off-site. The making of such visual links using computer technology can be useful to developing theories of place, for communication purposes with potential clients, or for public consultation.

In the process of making behavioural observations for the purposes of 'plotting' – in recording them initially on site and getting them into a computer – for it to be useful in integrated spatial-behaviour analysis, it would be necessary to retain a focus on the spatial/behavioural inter-relationship. To separate 'spatial

setting' and 'behaviour' is arguably the point of doing environment-behaviour research, but the argument in hand stresses the need to retain the integral nature of spatial-behavioural 'data' in one's analysis of space - whether in a research or design sphere.

As regards the use of computer technology for generating visualisations, whilst continuing advances in technology do allow expansion into new areas, with particular reference to GIS, Appleton and Lovett note:

"...there is considerable feeling that we should not allow ourselves to be guided simply by what the technology can do. Instead we should carefully assess whether each of these increases in capability can enhance the usefulness of visualisations. The need for a critical eye is particularly apparent when considering the advances in realism, since opportunities for realistic visualisations are rarely matched by the availability of suitably detailed data, and viewers' perceptions of factors ...".⁵²

⁵² APPLETON, Katy, LOVETT, Andrew, "GIS-based visualisation of rural landscapes: defining 'sufficient' realism for environmental decision-making", *Landscape and Urban Planning*, no 65, 2003, pp 117

It is notable that the results of Appleton and Lovett's investigation into the use of GIS based landscape visualisation (of rural landscapes) indicated that increased levels of detail help people to relate to a visualisation and imagine for themselves the landscape that is being presented. The researchers drew particular attention to ground surface and foreground detail.

Site based sketch-book style analysis and/or general field sketching could potentially be integrated with GIS technology for addressing the need for greater detail in visualisations which are produced for consultation purposes, as highlighted by Appleton and Lovett. Such visualisation could include sketches with behavioural aspects of place embodied in the visual-spatial approach. Researchers and designers alike could aim to integrate the different technologies for enhanced information analysis. In the meantime, this thesis provides a focus on the thinking process.

Some final notes on mental modelling theory emphasise the need to raise consciousness of the way in which we select and process information.

Some notes on mental modelling theory

The notion of mental models can be traced back to Kenneth Craik's suggestion in 1943 that the mind constructs "small-scale models" of reality that it uses to anticipate events.⁵³ Each mental model thus represents a possibility. According to the mental models theory, causal hypotheses enable our brains to store just enough information to allow us to take appropriate action ('response actions') where necessary based on the type of cause and effect associations we have learnt through life experience. We rely heavily on 'rules of thumb'. For example if a bus is careering down the road out of control heading in our direction, we would not notice whether 'a nightingale was singing in Berkeley Square' since our attention would be focussed on the bus and not any other details of the environment⁵⁴.

The point to be made is that we learn to select *key* information out of everything else that is going on around us by the fact that our brains are able to block out information that it considers irrelevant to the situation in hand. Jumping out of the way of a bus is an extreme life and death situation, but one that is relevant to all humans, in most

⁵³ DUNBAR, Robin, The Trouble with Science. Faber and Faber Limited, London, 1995

⁵⁴ op cit, DUNBAR, Robin, 1995

people's general 'life training'. However, when we embark on more specialised training courses, for example in the context of this thesis, landscape architecture, in the absence of a relevant knowledge base, we rely on a 'best guess' approach.

8.7 SUMMARY

The 'scientific' research approach was compared and contrasted with 'designerly' thinking. Changes in understanding about the nature of design were identified as having shifted over the years, moving from the systematic approach, to flow-chart type models to more recent thinking which presents a more philosophical position rooted in the interpretive/phenomenological perspective, and yet which at the same time, acknowledges the role of 'the method'.

Reflection was identified as being useful for raising design consciousness about gaps in knowledge. In particular, it was suggested that recognition of the two different purposes for gathering information, namely to generate ideas and secondly to test them, would be helpful for introducing an 'evaluation in action' approach.

It was noted that in new research directions the move is towards a contextualised approach in which quantitative and qualitative paradigms are merged. This is expected to reconcile the so called ongoing 'quantity-quality' debate. Towards reconciling the wider research/design gap, and in the context of the issues addressed in this thesis, it was suggested that a site survey method which is reflective and interpretive in the phenomenological tradition, could serve two purposes: firstly to help designers structure their design process more effectively to take consideration of the user, and secondly to help researchers structure their research more effectively with design considerations in mind.

Grounded theory was highlighted for providing a 'style' of research which is design-like. It was suggested for offering concepts and procedures for a reflective/interpretive mode of enquiry suited to the practitioner's field for introducing in an open-ended questioning approach which asks 'what is really going on?'. Girot's four stage conceptual 'method' was identified as a suitable model for being both general and yet specific to the landscape condition and a good fit with phenomenological approaches in research. The potential utility of the open-ended questioning approach together with a decision analysis approach to embodying evaluation and prediction in the decision

making process was highlighted in a combined 'action and analysis' approach. It was suggested that a similar thinking model is required for adding rigour to decision making for *design* purposes and a conceptual structure was suggested based on the decision analysis approach.

The role of visual display and creative thinking in developing knowledge and understanding was highlighted, and of particular relevance to the gap problem, for bridging relevant data together. The link between 'discovery' and 'representation' was highlighted where quantitative 'scientific' data was used creatively to generate new knowledge. The potential, and the limitations, of the use of computer technology for information gathering, processing and visual display was discussed with reference to GIS.

The need to raise consciousness of the way we select information and process it was emphasised. And, finally, mental modelling theory explained the highly selective nature of the human brain and our over-reliance on a best guess approach.

Conclusion

Research and design methodological approaches need to be reconciled in order to address the knowledge integration/generation structural aspect of the research/design gap problem. The utility of the phenomenological approach, as embodied in the reflective/interpretive approach offers a suitable research 'style' that is not systematic, is flexible, and yet which also acknowledges the role of 'the method'.

Aspects of the landscape design process can be made explicit and used as a background reflective/interpretive framework for application of the principles and procedures of integrated spatial-behaviour analysis, in the form of a site survey method. For this, Girot's four stage model, embodying aspects of grounded theory approach and decision analysis, should be used to direct the information gathering process such that data is used to both generate ideas and to test them for assessing user needs in an 'evaluation-in-action' approach. Such a method should have interchangeable use in research or design oriented studies - in the former case for providing a contextualised approach, and in the latter case for embodying user needs assessment within the design process.

Chapter 9:

TOWARDS A SITE SURVEY METHOD

"In order to think one has to process information." ¹

9.1 INTRODUCTION

With a view to reconciling research and design approaches, a reflective/interpretive approach is described in this chapter as a site survey method with application in the design or research process.

There are two parts to this chapter: firstly, the universal application of the approach in the form of a generic 'strategy for action and analysis' in different landscape settings, and at different scales, is described. This comprises a procedural approach designed to facilitate the application of spatial-behaviour analysis as a tool for embodying user needs assessment within the design process. Secondly, an application of the method is described where it is tailored to suit a forest wayfinding research project.

9.2 A GENERIC STRATEGY FOR 'ACTION AND ANALYSIS'

Introduction

In the reflection-in-action conducted so far in the thesis, a general method of investigation has centred the research activity on problem setting, information gathering, and knowledge integration/generation. Integrated spatial-behaviour analysis is both information 'gatherer', and knowledge 'generator/integrator' and as such the tool has shaped the research approach into a loose 'method' but at the same time the method has shaped the tool.

1. Problem setting - integrated spatial-behaviour analysis can help in both the research and design process for constructing a situation-specific, user centred, 'impression' of the landscape as a starting point for analysis, eg a tourist 'reception node' in Edinburgh's Old Town.

¹ HOGARTH, Robert, Judgement and Choice. The Psychology of Decision, 2nd Ed, John Wiley & Sons Ltd, UK, 1987, p 71

The utility of *landscape* spatial-behaviour analysis centres on the identification of cause-and-effect linkages between the spatial setting and human behaviour which indicates its use a) in design for identifying ‘real’ problems and establishing user needs issues in a more objective way, (but which is still design oriented), eg the ‘browsing blocker’ effect at the tourist reception node; and b) for structuring the information gathering process towards shaping a design-relevant outcome in the research study, eg the importance of ‘visibility’ of entrances to forest amenity sites.

2. Information gathering - as a cause-and-effect diagnostic tool, integrated spatial-behaviour analysis appears to help the designer and researcher alike explore a spatial setting for its ‘legibility of use’: this type of analysis can establish the existence of, and explore in detail, the specific nature of the initially identified potential problem areas, (eg the threshold *causing* the ‘browser blocker’ effect), structuring the information gathering process by exploring problems in progressively more detail in the sequential/cyclical manner in which the design process takes place. As explained earlier by White, this is a three-step process beginning with a ‘primal sketch’ in which a general outline is discerned, secondly the more subtle characteristics of texture and depth are perceived and final there is a realization of the complete external 3-dimensional image. In integrated spatial-behaviour analysis, ‘testing’ and ‘imaging’ are infused and this **evaluation-in-action** becomes embodied in the design process.

The application of evaluation-in-action remains relevant in the social research style study, because spatial-behavioural information provides data that can be used to contextualise interview analysis, to verify and/or gain further insight into problems and issues arising, *as they arise, in the way that they arise*, eg by comparing the ‘invisibility’ of a gate to a forest amenity site, with another gate with good visibility, not only was a cause and effect established, but a design criteria for ‘good’ wayfinding hypothesised (ie, entrance visibility).

Essentially, it may be said at this stage that information gathering is an important linking activity for exploring the interrelatedness of ‘the problem’, ‘the user’, the ‘context of use’ and the potential end solution type. By gathering *spatial-behavioural* information, the study remains focussed on problems that are

resolvable through design intervention, and as explained by Zeisel, information can be used for two different purposes in design: firstly, information can provide a general understanding, or convey a mood or a feeling of some environment ('image' information), and secondly information can be used to evaluate specifics of a design concept ('test' information).² However, both image and test information are drawn from the same body of knowledge.

Finally, this thesis has found that spatial-behavioural information is most useful to design when it provides imageable spatial-behavioural phenomena describable verbally and visually in 2-d, 3-d, and 4-dimensions. This helps bring the landscape into perception such that it can be dealt with.

3. Knowledge integration/generation: the indications are that integrated spatial-behaviour analysis is useful for generating theory in the form of useful, (and potentially usable), 'system image' models of generic 'types' of landscape experience eg forest wayfinding, and for identifying situation specific design criteria relevant to a particular *type* of landscape experience and leading towards the identification of design solutions that appropriately meet with user needs.

In summary, the role of the design process itself is instrumental for interlinking the core activities of problem setting, information gathering and knowledge integration/generation, whilst evaluation-in-action is the critical process for 'testing' the incoming spatial-behavioural and other data sources, which help construct (generate) system image models.

Evaluation-in-action

Technically, the purpose of an evaluation is to assess the effects and effectiveness of something, typically some innovation or intervention.³ For the purposes of evaluation-in-action, this occurs during the 'test/retest' phase, *within* the design process. During this (evaluative) phase we are, or should be, 'comparing what happened' with 'what we want to happen'.

² ZEISEL, John, Inquiry by Design. Tools for Environment-Behavior Research. Wadsworth, Cambridge University Press, 1984, UK, USA, Australia.

³ ROBSON, Colin, Real World Research – A Resource for Social Scientists and Practitioner-Researchers. Blackwell Publishers Ltd, Oxford, UK, 1993

Information gathering is the key activity for generating relevant data for analysis. In addition to generating different ‘categories’ of information (ie ‘image’ and ‘test’) data can be generated from a variety of sources, for example interview findings, or book based knowledge on wayfinding theory, for example. However, whereas such knowledge helps in our general understanding, in situated, contextual analysis, the designer/researcher must generate a theory to explain events. As described earlier, in grounded theory approach there is a high degree of interplay back and forth between practical and theoretical modes of enquiry allowing theory to be generated from the data in a mode of thinking which questions ‘what is *really* going on?’

Aspects of grounded theory approach should be considered integral to the type of ‘grounding’ that occurs in Girot’s conceptualisation of the design process. This was illustrated in the last chapter and is reproduced below with some variations to highlight the use of ‘image’ and ‘test’ information in the generating of the system image:

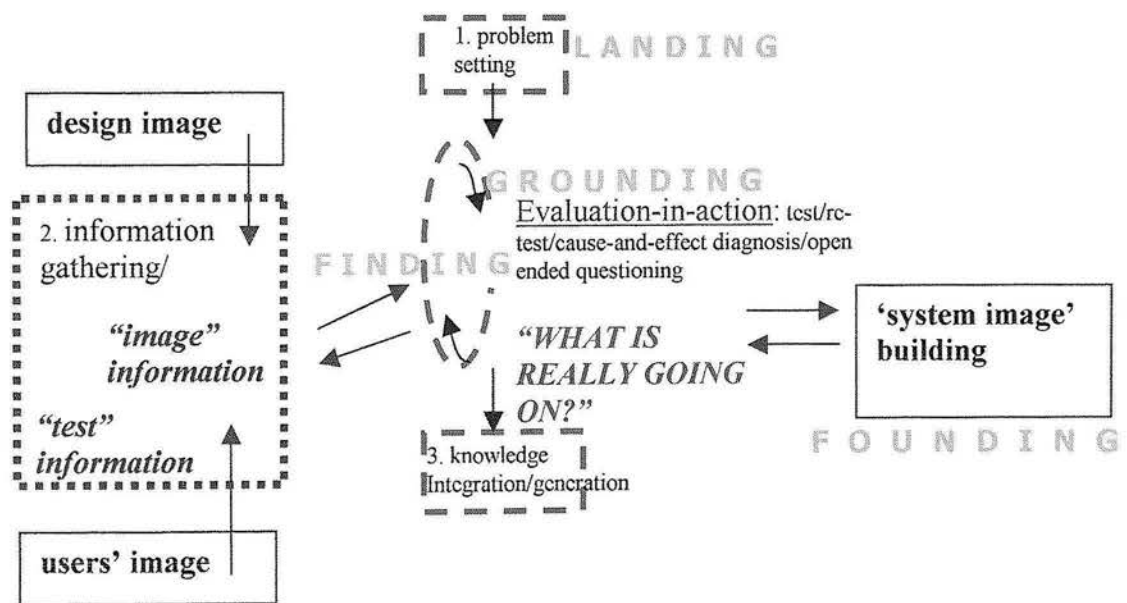


Figure 9.2- A methodological framework.

In the central area of the diagram where grounding and finding operate in cyclical action, the role of ‘self’ becomes critical for generating a system image model of the landscape experience using extant information sources (eg observations, role-play and interview data). One’s own impressions are also generating ‘image’ data. However, where image data is gathered for ‘evaluation-in-action’ purposes, where the information is used to compare the “users’ image” with the “design image” towards establishing a “system image”. (See above diagram).

The overall model accounts for the design process in which ‘design hypotheses’ are constantly being generated from incoming ‘images’, but on the other hand the ‘testing’ process is necessary in order to *objectify* the *subjective* nature of the incoming image information. Thus, the ‘self’, *together* with the information processing tools provided by this thesis in the form of spatial-behavioural theoretical structures and practical analytical techniques as already described, might therefore be considered knowledge ‘generators/integrators’; on the other hand the model acts in the background as a ‘facilitator’. The overall approach aims to provide a flexible methodology in which these ‘generators’ and ‘integrators’ become operational in conjunction with background activities that have a facilitating role in establishing an *experiential* framework for analysis *within* which integrated spatial-behaviour analysis takes place. The generators/integrators are essentially theory building tools and techniques (eg sequence diagramming) that help generate the design theories grounded in the data and it is these which help construct the system image.

The purpose of the exercise in this chapter is to make explicit a series of individual methods that have generalised application in design, or that might be used to formulate a methodology for research purposes. The methodological possibilities and implications will now be considered, followed by an account of the wayfinding study.

9.2.1 LANDING

Girod describes this as ‘a state of just landedness’. It sets ‘the stage’ which is one where intuitions and impressions prevail. It refers to “the moment when a designer reacts to the difference between his or her preconceived idea of a place and the reality that appears during the first steps of a visit”⁴ and occurs with subjective and interpretative eyes. Girod stresses the importance of spending time to simply discover what already exists because it may not be obvious at first sight, or may not be easily ascertained. This period of time should enable designers to *experience* a place.

Problem Setting

Problem setting is the departure point for the practitioner, whether in research or design:

⁴ GIROD, Christophe, in CORNER, James, (Ed), *Recovering Landscape. Essays in Contemporary Landscape Architecture*. Princeton Architectural Press, USA, 1999, p 62

"...we select what we will treat as the "things" of the situation, ...we impose upon it a coherence which allows us to say what is wrong and in what directions the situation needs to be changed. Problem setting is a process in which, interactively we *name* the things to which we will attend and *frame* the context in which we will attend to them."⁵

When we [practitioners] set the problem, we set the boundaries of the problem. This in turn structures the direction of the design, or research, process. In the context of design:

"There can be no solution without a problem; and no problem without constraints; and no constraints without a pressure or need. Thus, design begins with a need. Either the need is automatically met, and there is no problem, or the need is not met because of certain obstacles or gaps. The finding of means to overcome these obstacles or gaps constitutes the problem."⁶

Although the problem is not properly defined until the process reaches a conclusion (ie at the stage of 'founding'), it provides design/research direction. The stages of thinking which comprise 'cycles' of design from 'the primitive' to 'the sophisticated', and which are driven by incoming information influencing each cycle of decision making, the nature of 'the problem' becomes clearer. In examining the utility of spatial-behavioural analysis in the decision making process for landscape design, this thesis suggests combining it with Lynch's 'strategy for action and analysis'⁷ which he proposed should be used for fitting studies to the context of issues.

In extracting key questions from Lynch's approach, the wording 'sensory' is substituted with 'experiential', and the wording 'spatial' is substituted with 'spatial-behavioural'. These could be considered the questions for use in a 'cost/benefit analysis' type of approach as suggested in the previous chapter, for structuring the information gathering in an ongoing questioning process, to check the relevance of the information being gathered at the different stages:

- What is the basic [**spatial**]-**behavioural**] framework of the region: its typical areas, its principle centres, and major routes?
- What are the most striking [**experiential**] characteristics of these elements? And finally,
- What are the means of capturing the 'essential [**spatial**]/**behavioural** structure'?
- What are the most obvious [**experiential**] problems and possibilities of 'the region'?⁸

⁵ SCHÖN, Donald, A, *The Reflective Practitioner: How Professionals Think in Action*. Temple Smith, London, 1983, p 40

⁶ ARCHER, Bruce, in CROSS, Nigel (Ed), *Developments in Design Methodology*. John Wiley & Sons Ltd, UK, 1984, p 59

⁷ LYNCH, Kevin, *Managing the Sense of a Region*. The MIT Press, Massachusetts, USA, 1976, p 59/60

⁸ *ibid*, LYNCH, Kevin, 1976, p59/60

For this, one must identify the ‘typology of use’ which characterises the area, for example, this might be ‘tourist-historic city/fortress city type/exploring’, or ‘countryside recreation/forest/wayfinding’. For designers, such typologies must have spatial form.

Context mapping

For identifying the basic spatial framework of a region, Lynch suggests the use of the spatial diagram. He suggests that, of necessity, at the scale of the region, the strategy should be of partial studies and actions, but the study should begin by making a comprehensive analysis of the whole (region). Figure 9.2.1.i illustrates the essential spatial structure of an area of Paris.

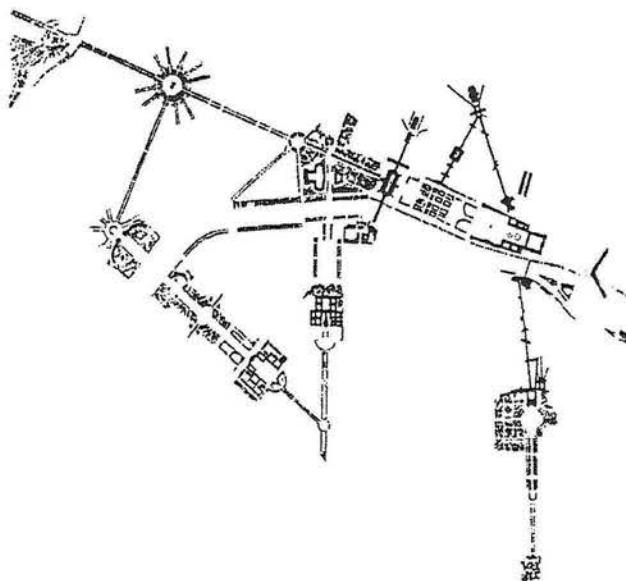


Figure 9.2.1.i - The ‘essential spatial structure’ of an area of Paris. (LYNCH, 1976, p 122)

There is another approach to mapping space which integrates psychological and geographic thinking. Guy Debord developed a cut-out technique which he termed ‘psycho-geographic’ mapping (see figure 9.2.1.ii below). The notion of psychogeography as conceptualised by Debord⁹, went hand in hand with the cut-up technique which he used to map ‘situations’. Psychogeography is a pseudo-science and for the Situationists this provided a method of rediscovering a city’s lost values. Thus, the intention of the psycho-geographic maps was to create ‘a science of situations’ by borrowing elements from psychology and urban geography. Although, its original application was to map the city as it occurs through ‘purposeful disorientation’ (getting lost on purpose) its application could equally be applied in spatial-behaviour mapping to

⁹ [Debord was a prominent figure in the Situationist International movement 1957-1972.]

‘select’ from the environment the key elements that help a user find his/her way for example to a forest site from the surrounding road network.

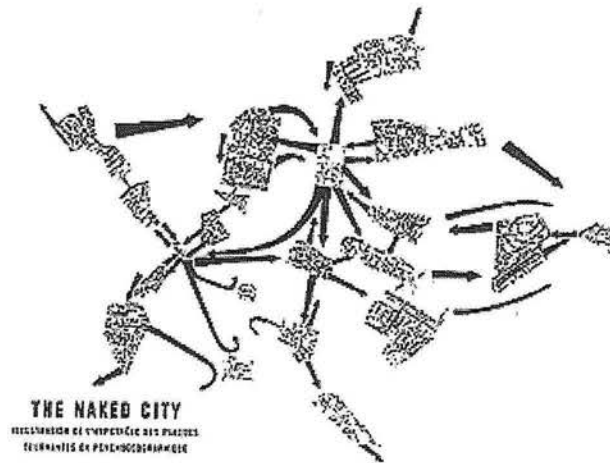
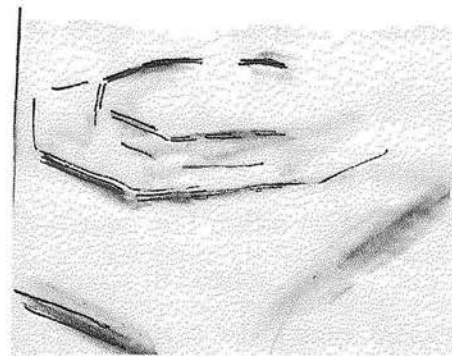


Figure 9.2.1.ii - Psycho-geographic mapping as illustrated by ‘The Naked City’, by Guy Debord¹⁰

In the original behaviour setting survey approach described earlier, the ‘milieu’ was a key concept in identifying behaviour settings. In any behaviour setting, the milieu has to afford the standing pattern of behaviour in order for the behaviour to take place. It was also suggested earlier that the milieu could more usefully be considered the interface, and the standing pattern the dominant behaviour pattern occurring between humans and the environment, providing the setting’s ‘essential *spatial/behavioural* structure’.



(a)



(b)

Figure 9.2.1.iii – Gaining a spatial-behavioural impression of place. (a) - A place with spatial/behavioural attributes (a node^{BS}). (b) – A structural impression of the spatial/behavioural form of this place.

Figure 9.2.1.iii (b) illustrates how Lynch’s method might be adapted for use in identifying the essential *spatial/behavioural* structural qualities of an environment setting just as described earlier for the Aberdeen situation, where a behavioural ‘impression of place’ was gained. The same is applicable at local scale as demonstrated

¹⁰ Guy Debord’s Situationist map of ‘The Naked City’ illustrated in : COATES, Nigel, *The City in Motion*. Rizzoli International Publications Inc, New York, 1989, p 16

below. Here, the points where people interact with the setting are recognised as having form-giving properties and which give an overall and quick impression of its structure.

It was suggested earlier that the spatial-behaviour approach provides a departure point for analysis which does not begin with ‘form’ but rather, with form in *relation* to function. The context of use is particularly important when summarising the *spatial-*



Figure 9.2.1.iv – The tourist experience in Trafalgar Square, (photo by author, June 2001)

behavioural ‘essential character’ of a place.

Experienced designers do this unconsciously when ‘landing’ at site to sum up the landscape character in a spatial way.

This enables the designer to identify some key issues which help structure useful information gathering, for example, to identify the factors that make Trafalgar Square conducive to tourists for ‘spending time’. Thus, in a spatial-behaviour approach, this would necessitate identifying links between patterns of use and the environmental factors that cause them. It is difficult sometimes to find the words to sum up an overall experiential

impression of a place – it is often easier to describe such experiences *visually*. (see figure 9.2.1.iv).

In open space settings, macro patterns of use can be influenced by the smallest of details. Some factors are ‘invisible’ such as pollution, and traffic noise, and some come and go, for example the pigeons at Trafalgar Square in London,¹¹ but if they are a constant feature of a place, then they are relevant. The skill is to select those factors that are key to a place’s ‘essential’ character.

9.2.2 GROUNDING

Whereas ‘landing’ only happens once, Grounding is more about reading and understanding through repeated visits to a site. This has less to do with individual imagination and relies more on careful research and analysis. It entails a process of ‘unlayering’ both the visible and invisible forces and events that ‘undergird’ the

¹¹ [Pigeon feeding is now illegal in the square].

evolution of a place. In relation to information gathering for evaluation-in-action purposes, this takes place in 'cycles' of analysis together with the process 'finding'.

9.2.3 FINDING

This entails the process of searching as well as the outcome, or 'the thing' discovered. It is both an activity and an insight. Finding usually discloses the evidence to support one's initial intuitions, which is something that is integral to the landscape structure. This may be something physical or experiential.

To begin the cycle of 'action and analysis' which grounding/finding encompasses, and of particular relevance to an evidence based approach to design, Lynch asks:

Who are the principal client groups with a stake in [experiential] quality at this scale?

For example, the tourist industry, outdoor recreation bodies, and so on, are the agencies towards which design or research outcomes must be made addressable. But also, individual research or design aims drive the information gathering process.

'Seeing', or in other words observation, is the designer's main tool. For environment-behaviour research purposes, observation methods are applied within different 'modes' of analysis. In describing, and making explicit their research methodologies, traditionally qualitative research categorises three types of observation: casual, formal and participant observation¹²:

- casual observation: This is usually used for planning stages of research. This helps decide the best location and for developing categories to be used in systematic observation. The approach values first impressions and note taking is its main task since observations are most vivid and most useful when written down immediately. This is effectively what was carried out during the 'landing' stage in the Aberdeen pilot study.
- formal observation: this is the planned and systematic application of a system of procedures for conducting the observations or gathering the data, usually from one

¹² BREAKWELL, Glynis M., HAMMOND, Sean and FIFE-SCHAW, Chris (eds), *Research Methods in Psychology*. Sage Publications, London, California, New Delhi, 1998

or a combination of the theoretical approaches discussed above. This is usually, but not necessarily a more intrusive approach than casual observation. This was carried out in Edinburgh's Princes Street to obtain a complete record of all stationary activities in the street at a particular time of day.

- participant observation: here, the observer becomes a part of the events being studied, that is, a participant in the culture or context being observed. . This is also termed the ethnographic approach (as adopted by William Whyte). This enables access to attitudes, opinions, and feelings, but it also renders impartiality impossible.

Since this is traditionally the method for the anthropologist the literature on participant observation discusses how to enter the context, the role of the researcher as a participant, the collection and storage of field notes, and the analysis of field data. Participant observation often requires months or years of intensive work because the researcher needs to become accepted as a natural part of the culture in order to assure that the observations are of the natural phenomenon. In the context of environmental design, Cooper-Marcus/Francis suggest the use of the method to experience and 'be' in a place and make 'subjective' observations. However this thesis suggests that although such observations have a role to play, they should be 'objectified' in an 'evaluation-in-action' approach, in an ongoing 'test/re-test' mode of operation.

Researchers also categorise the techniques used in each of the three main approaches (outlined above) in terms of i) direct and ii) indirect observation:

- i) direct observation. Firstly, direct observation is not traditionally a feature of participant observation. A direct observer doesn't typically try to become a participant in the context. However, the direct observer does strive to be as unobtrusive as possible so as not to bias the observations. It is a more objective approach, suggesting a more detached perspective since the researcher/designer is watching rather than taking part. Technology can be a useful part of direct observation. For instance, one can videotape or observe from behind one-way mirrors. Also direct observation tends to be more focused. The researcher is observing certain sampled situations or 'phenomena', rather than trying to become immersed in the entire context.

Techniques which can, and have already been described for their utility for infusing spatial analysis with the behavioural approach in this thesis are selective observation, behaviour setting survey approach, and behaviour circuitory. These can take place either “on the spot” or on the move – eg by ‘tracking’ people.

- ii) indirect observation. These are techniques used to study the *effects* of behaviour. These are unobtrusive measures and in the current study, are employed to construct a ‘picture’ of the user’s experience of place. These techniques are particularly useful where it is either impractical or unsafe to make direct observations, but also they are used to ‘simulate’ the user’s experience – for example the route experience when finding a forest site, and the user’s experience at site on arrival when there are no visitors to observe. Such techniques include role play and trace behaviours. However, this thesis emphasises the use of behaviour setting/behaviour circuitory for both indirect and direct observation, and is embodied within spatial-behaviour analysis, in which approach the distinction lies between identifying ‘what is actually happening’ and ‘what we want to happen’.

One further technique traditionally described for indirect observation is the use of unstructured or informal interviews. Unstructured interviewing is considered an additional useful tool since it can be conducted with no particular expertise and can occur spontaneously in the context of general site analysis. It can explore that which is inexplicable through observation alone. Although the approach is categorised ‘indirect observation’, it involves direct interaction between the researcher and users in order to ‘observe’ behavioural responses. It differs from traditional structured interviews in several important ways. First, although the researcher may have some initial guiding questions or core concepts to ask about, there is no formal structured instrument or protocol. Second, the interviewer is free to move the conversation in any direction of interest that may come up. Consequently, unstructured interviewing is particularly useful for exploring a topic broadly.

The distinction between ‘direct’ and ‘indirect’ helps make explicit one’s methods. It is not however helpful in explaining where and when different types of observation should be used. For design purpose it is more helpful to first define the units of analysis and

then allow the type of issues arising to dictate the appropriate observation method, eg 'tracking' or 'spot' observations.

In the first instance one must define 'macro' units of analysis. These are generic types of landscape experience supported by a spatial setting within a given cultural setting. In experiential terms 'descriptors' of typologies of use are particularly useful, for example:

- *the tourist discovery experience* (eg in the street setting of a European 'tourist-historic' city)
- *the street shopping experience* (eg in the British high street setting)
- *the forest wayfinding experience* (eg in the British countryside setting, or this could be the urban fringe)

When narrowing the scope of observation, the utility of Dee's landscape model in relation to the Lynch model might be considered. '*Paths/edges/thresholds/foci/detail*' might be considered a sub-set of landscape elements that work against a background, structural form, which is explained by Lynch's model in terms of '*PATH/EDGE/LANDMARK/NODE/DISTRICT*'. It was suggested that PATH/foci could be used as an expression of 'form and function' in the landscape, where for example 'PATH' is the main form element in the landscape, but that 'the path' acts (ie has function) as a 'foci' in the wayfinding system. When integrating the use of the behaviour setting and behaviour circuit concepts, the unit of analysis is 'nested' and given expression such as 'NODE/threshold^{BS}', or 'NODE/path^{BC}'.

In the ongoing process of information gathering, at critical stages in the design/research process, Hogarth's decision analysis approach asks:

What are the costs and benefits of securing additional information?¹³

In relation to the observation study, Zeisel suggests a 'behaviour descriptions and corresponding question' approach which might help in this respect (figure 9.2.3). This begins with a 'general description', it relates the observation to a relevant design question, progressively focusing in on more and more detailed descriptions which finally narrow down to detailed design. This is therefore another device for narrowing

¹³ op cit, HOGARTH, Robert, 1987

the scope of the observation study from the general to the specific which can help generate design hypotheses from observations in a research oriented study. This is a deductive approach whereas, in the inductive approach to theory building, the device works from the bottom up, starting from the specific, moving towards the general.

For structuring user needs assessment, the thesis found an approach loosely based on facet theory, to be useful in focussing information gathering for end-point analysis, using selective observation.

	Behavior Observation	Design Question
General Description	"Shopping" as opposed to "hanging around"	In a shopping-center plan, how many places are needed for people to hang around, and how can they be designed to augment rather than interfere with shopping?
	Shoppers browsing as opposed to buying something	How should items be displayed so that browsers and buyers can see them but buyers have greater access to them?
	Where and how often shoppers stop in supermarket aisles	How can flooring materials, lighting, and aisle length be designed for maximum convenience to customers, maximum exposure of sales items, and minimum maintenance?
	How high patrons will reach and how low they will stoop	What shelf design and what product placement (what size container on what shelf) will ensure that customers have the easiest time reaching items?
Detailed Description	Where customers' eyes focus while moving down an aisle	Where should standard signs be placed to convey the most information, and where ought sale signs be located to catch customers' glances?

Figure 9.2.3 -A behavioural observation/corresponding question approach, moving between the general and the specific.

The following summarises the potential of the theory:

Examples of 'facets' of landscape experience

From a spatial-behavioural point of view 'facets' of analysis are defined by the research and/or design question. For example the following parameters of analysis have arisen out of the studies conducted by this thesis:

Example i:

Assessing the quality of the <tourist > experience in <Edinburgh Old Town area>:

what factors make <a street space> conducive to <spending time/browsing on foot>?

First of all, there is a basic framework question: *what factors make <place> conducive to <activity>?* The wording 'conductive to' is significant: the research does not pre-

suppose that the environment *determines* behaviour, but rather that there is a two-way relationship in which there is a cause-and-effect transfer between people and environment. Thus, certain spatial arrangements and their contents work together to set the conditions that help rather than hinder a generic activity, and although human activities are generally a consequence of motivation and purpose, in the spatial-behavioural context, the relevant activities are those that are taking place as a consequence of the setting (eg 'to find <Dalby>forest', 'to explore the historic streets of <Edinburgh>', 'to spend time in <Princes Street, Edinburgh>').

In the basic framework question, the sentence separates 'environment' (<place>) from 'behaviour' (<activity>) but retains the spatial-behavioural integrity of the relationship by the sentence structure, thus: *what factors make <place> conducive to <activity>?*

In the urban tourism study, until the solution type was identified – that is, the 'gateway' effect created by the string of flags across the street space – a cause-and-effect diagnosis could not take place. Thus, by first identifying the factors that *help* the user (in a site specific setting) the designer is provided with a solution type that is 'imageable', ie, has spatial form and structure. The designer can then use this as an 'ideal' prototype system image, (or 'what I want to happen'), and this in turn can structure our information gathering process (or 'what can be physically changed to generate this type of behavioural response').

Having structured a 'system image model', of what is happening (in this example, 'the browsing blocker' effect) and compared with a prototype system image of what we want to happen (the gateway effect caused by the flags, ie the 'design' image), then useful assessment (the evaluation) can take place. Thus, an evaluation model that is *situated* spatially, culturally and experientially is generated. This is the type of critical framework needed for useful analysis in landscape design.

The designer can now take the analysis a stage further and a) identify the specific factors that *hinder* the tourist discover experience (configurational and content cues that deter because of a 'dead-end' effect); b) *explain* the problem (a lack of connectivity between mystery/LEGIBILITY); and c) identify *appropriate* solution type alternatives. Banners were suggested to create a year round gateway effect, but other alternatives which have been seen to draw people down during the summer period at this place

include the placing of café table chairs at the end of the space. To enhance the effect, ornamental trees in pots for example could help communicate a 'silent message' which states 'there is something going on here' and 'you are welcome'.

Other examples of 'facets' of landscape experience are as follows.

Example ii:

Assessing the quality of the <street shopping> experience in <the high street>.

- *what factors help create <a pavement area> conducive to <spending time>?*

Example iii:

Assessing the quality of the <forest wayfinding> experience in <the countryside setting>:

- *what factors help create <a forest site> conducive to <finding with ease> < by car>?*
- *what factors help create <an entrance> conducive to <finding and using easily and safely> < by car>/ and, on arrival*
- *what factors help to ensure <the facilities around the immediate arrival area > are <easy to find and use> < by car/on foot>?*

The universal applicability of integrated spatial-behaviour theory and its analytical tools and techniques is necessary if it is to achieve the bridging effect that the thesis suggests it has the potential to do so. Each site survey is conducted with different research/design aims in mind. For example, a survey of an area with the disabled in mind, could be structured as follows:

Example iv:

Assessing the quality of the <wheelchair user's> <shop browsing> experience in <Edinburgh Old Town area>:

what factors make <a shop façade/street edge> conducive to <spending time/browsing in a wheelchair>;

9.2.4 FOUNDING

At the final stage of design, the three prior acts are synthesised into a new and transformed construction of the site: whatever the nature and form of the response, this is always a reaction to something that was already there, and generally involves bringing something new to a place. It may or may not involve a physical design

intervention – it may involve the framing of a new point of view, or may involve a change of use of a place.

In the final stages of a strategy for action and analysis, Lynch asks the following key questions:

What are the probable means, within the agency's influence which could change the [experience] of the region [setting]?

Or, in other words,

What can and cannot be changed and what are the design alternatives?

The question in the end is simply 'has there been sufficient analysis of the problem?' If, as is invariably the case the answer is no, the consequences must be reassessed, however if the answer is yes, then one asks 'which alternative has the greatest expected utility?'.

Application of the general methodology in the forest wayfinding project will now be described. Firstly, the key aims, objectives and outcomes of the study are outlined.

9.3 A FOREST WAYFINDING PROJECT – SUMMARY OUTLINE

The Forestry Commission appointed the 'OPENspace – The Research Centre for Inclusive Access to Outdoor Environments', Edinburgh College of Art/Heriot-Watt University to conduct phase two of a report on the effectiveness of wayfinding systems with forest users¹⁴. This report followed an initial phase one scoping study which was instigated after an annual UK wide Forestry Commission visitor survey revealed a low satisfaction rating with road signs¹⁵. This researcher played an active role in both phases of the research, introducing spatial-behaviour analysis as an aspect of the environmental survey component of the study, which was conducted to contextualise a visitor questionnaire survey.

¹⁴ FINDLAY, Dr C, SOUTHWELL, K, WARD-THOMPSON, Catharine, ASPINALL, Peter, "The Effectiveness of Wayfinding Systems with Forest Users: Phase II – Identifying User and Site Information Needs." A report for the Forestry Commission, to OPENspace the Research Centre for Inclusive Access to Outdoor Environments, Edinburgh College of Art/Heriot-Watt University, [DRAFT REPORT, February 2003]

¹⁵ FINDLAY, Dr C, SOUTHWELL, K, WARD-THOMPSON, Catharine, ASPINALL, Peter, "Effectiveness of Wayfinding Systems with Forest Users. Phase One: A Site-Specific Scoping Study", Report to the Forestry Commission, Landscape Design and Research Unit, School of Landscape Architecture, Edinburgh College of Art, Heriot-Watt University, January 2001

The research problem

Phase One of the project was a scoping study. The findings from this study confirmed that there was a problem related to signage, but that the problems were a combination of issues related to the placement as well as the content of signs. The study revealed that either information was absent when and where it was most needed, or alternatively information was available to visitors - but it was inappropriately located or was in an inaccessible form. Significantly, the study highlighted that inadequate signage was having a direct consequence on visitors' wayfinding abilities. Phase II was commissioned to further investigate the problem.

The research aims and objectives

A key aim of the original study was the development of a pilot methodology for wayfinding which involved public participation in the evaluation of signage procedures through an interview survey.¹ The phase II study presented a research brief in which the following aims were set out:²

- to explore the challenge of delivering minimum visitor information at key locations to maximum effect in a cost-effective and appropriate manner;
- to develop guideline and training packages for Forestry Commission personnel responsible for designing, implementing and evaluating wayfinding signage systems;
- to identify discrepancies in perception between users and providers of signage.

For this PhD the wayfinding study provided a theoretical and practical context in which to situate the thinking process out of which the concepts, theories, tools and techniques for integrated spatial-behaviour analysis (as described by this thesis) were generated, and in the process, derive generic, and site specific, system image models of wayfinding together with a set of criteria for wayfinding design in open space setting, as well as satisfy the main requirement of the research brief – to produce a wayfinding toolkit that would be useful to, and usable by, forest managers.

¹ FINDLAY, Dr C, SOUTHWELL, K, WARD-THOMPSON, Catharine, SALHEEN, M, and ASPINALL, Peter, "The Effectiveness of Wayfinding Systems with Forest Users", Conference Proceedings to 'Monitoring and Management of Visitor Flows in Recreational and Protected Areas', February 2002

² FINDLAY, Dr C et al, [2003]

Research outcomes

In the context of this PhD thesis, the research is concerned with exploring the potential role, and utility, of spatial-behaviour analysis in a real world research project. The main outcome of phase II of the wayfinding study is a 'wayfinding toolkit'.

A wayfinding toolkit

This is a prototype wayfinding assessment method.³ Using four site survey tools, together with an interview questionnaire, the complete toolkit is intended to enable the forest manager to establish whether there is a problem or not, and if so, whether it is related to i) sign content, ii) sign placement, iii) the entrance and/or iv) the immediate arrival experience. It was designed for use by *non-designer* forest managers to evaluate and assess visitor wayfinding needs at their own sites. However, the basic set of 'tools' are a simplification of techniques for visual-spatial-behavioural analysis that were mainly developed by this researcher to assess sites against a set of *wayfinding* design criteria. These criteria were established in the study, 'grounded' in site based analysis.

An emergent set of criteria for design

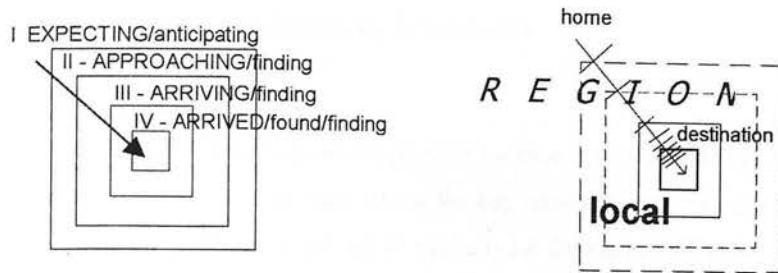
A set of criteria for good wayfinding design were established by comparing and contrasting individual wayfinding 'systems' and this took place both during site analysis ('in action') and afterwards in desk study. Five sites were surveyed during the second phase of the project for case study analysis. However, sites visited during the first phase of the study (five further sites) provided further data to draw on, for example when seeking out 'types' of forest parks and road/signage arrangements, for comparative analysis purposes. Data-sets comprised 'experiential' (visual-spatial sequence style analysis), and interview data (collected by another researcher) and sign inventories (compiled through a sign audit also conducted at each site).

A wayfinding model (or system image)

A system image wayfinding model, as discussed in chapter 6 and reproduced below, materialised when spatial-behavioural thinking infused the research process: this was achieved by comparing visual-spatial data sets with interview data. The perfect model site was not found to exist because in the sites visited there was usually one or more aspects of the wayfinding system that were 'good', one or more that were 'bad'. A

³ It should be noted that the intellectual property of the toolkit resides with the Forestry Commission.

broad pattern of problem areas emerged which became considered in terms of four levels of wayfinding. This is the 'primitive sketch' of the system.



'Decision spaces' were taken as its basic units of analysis. These units were deemed to be those that occupied physical space, that is the hierarchy of routes to site, from regional routes to local feeder roads and the circulation space on site, within which decision making took place. This is entirely appropriate given that the environment and graphic communication provide the user with the information to solve the imposed problems.⁴ Whereas each site presents a unique set of conditions, the wayfinding sequence provides a 'static' model of the generic experience, whilst the methods used to gather data, and to process and analyse it, provide the 'dynamic' application of the tool. The model is specific to a particular 'typology of use', ie wayfinding in the countryside/route setting. As such, if the model is proven to useful, in theory, it should have universal application in the design and evaluation of wayfinding systems to other countryside recreation bodies. (This is yet to be discovered).

A methodology

Because 'methodology' is a fundamental aspect of research, research methods, approaches and techniques must be made explicit. In the wayfinding report the use of integrated spatial-behaviour analysis was described in its context of use as 'the environmental survey', and which was conducted alongside the interview survey.

The environmental survey was described in the report as follows:

Environmental survey

The environmental survey comprised the route survey, sign survey, spatial analysis and environmental-behaviour methods.

a) The route survey

The key routes to site were identified (from visitor comments and road maps) and surveyed.

⁴ PASSINI, Romedi, "Wayfinding design: logic, application and some thoughts on universality", Design Studies, no 17, 1996, pp 319-331

Visual access to the signs as *experienced* by the road user, visibility from the road and the general nature of the route experience, were recorded. The methods used for the route survey are predominantly observation based, combining spatial analysis with environment-behaviour research methods. The data is predominantly in visual form.

b) The sign survey

This was an audit of signage where physical location and informational content was recorded. All directional and reassurance signs along the key routes to site, both road highways signs and FC signs, entrance signs and signs up to and around the central information point, which contained information relevant to finding the wayfinding task of finding the site were recorded. Standard auditing procedures were used to systematically log the signs - photograph them and map them in their locations on site - and catalogue them afterwards in a desk study.

The sign locations were plotted on route maps whilst the sign content was catalogued using inventory sheets. A numbering system cross referenced the signs in their locations with detailed descriptions and images of each sign provided in a sign inventory sheet. Images were stored electronically using Microsoft PowerPoint (2002).

c) Spatial analysis

Spatial analysis, as applied in landscape architecture, is a tool for defining the spatial structure of the landscape. In the current study, spatial analysis was used to analyse and define route complexity, the route experience and wayfinding-relevant spatial issues.

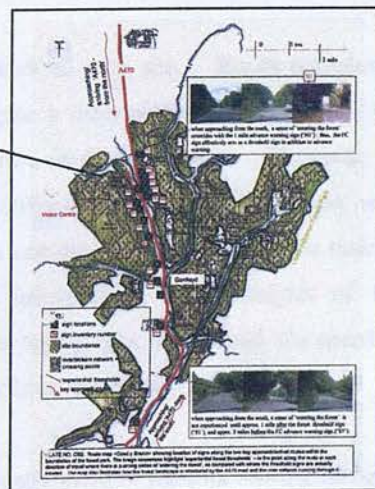
i) Route complexity.

Landscape form and route configuration are inextricably linked. In this study, it is the road network to, and the layout at, a forest site that provides the spatial setting of the wayfinding journey. The configuration of the route network can be complex and this in turn can make wayfinding difficult, since each road junction represents a decision point in the journey. Route maps and 'Space syntax'⁵ were used to analyse and define route complexity.

Figure WM2 illustrates a route map of Coed y Brenin.

Fig. WM2.An example of a route map: Coed y Brenin

entrance



⁵ Space Syntax is copyrighted to Space Syntax Limited, UCL, London.

Space Syntax is a tool for analysing the configuration of spatial systems. According to the theory of space syntax, space has its own rules which humans use without thinking when moving from one place to another and therefore, according to the theory, the way public space is used can be mathematically predicted (Hillier, 1996). The root of the theory is that people have a preference for easy journeys. Its basic model is a transformation of the total spatial system in *axial lines*, which are defined as the fewest and longest set of lines of accessibility and visibility that can be drawn in the spatial system (See Figure WM3).

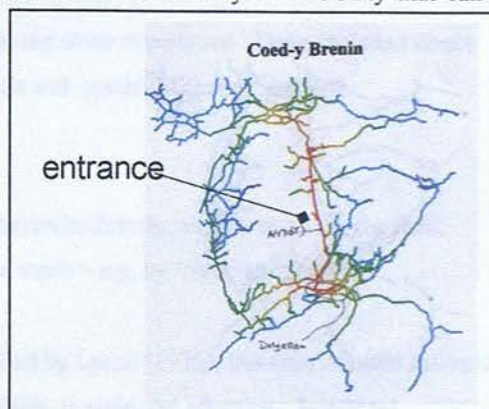


Fig. WM3. Space Syntax diagram of road network to Coed y Brenin

This model is then analysed according to the connectivity of each axial line to all others in the system. In brief, and in consideration of the current wayfinding study, connectivity or in other words intersections, represents a wayfinding task which is the decision needed at intersections.

The most integrated line is indicated in red. This represents the road that is most spatially dominant, and therefore most accessible from all other parts of the system. In this example the site happens to be located directly off this road and thus the route to the site may be defined as 'simple'.

ii) The route experience

The wayfinding experience is structured by the route network to each site. Route complexity affects the decision-making process and is to a large degree a determinant of difficulty in the visitor's transition through the road network, and therefore in finding a site. However, in wayfinding, it is not complexity itself that creates user difficulties, but the combination with inadequate design, where signage systems and settings do not incorporate the decision making process (Passini, 1992). Therefore, the methodology incorporates some analysis of the combination of physical and 'experiential' factors, such as the topography of the road, the speed of travel and visibility, to identify spatial factors associated with forest wayfinding.

'Spatial analysis' was used to record and analyse the spatial experience of the user *moving* through the landscape. For this the landscape architect has a tool known as the 'spatial sequence' method (Cullen, 1971). This is used to break down a route experience through the landscape into visual

sequences. Another tool similar in approach is the 'view from the road' method (Appleyard, 1964). This provides a method for recording the driving experience along the road where photographic image sequences are used to initially record the route, and where sketch analysis is used to analyse the experience. The 'view from the road' approach aims to capture essential elements that make up the visual sequence: the photo sequences are intended to simulate the scanning of the human eye, leaping from element to element whilst moving through the landscape.

d) Environment-behaviour methods

Observation-based techniques were used to analyse the route experience. These included direct observation, indirect observation, 'scenario' analysis and spatial-behaviour analysis.

i) Direct observation.

These are techniques used to observe people's behaviours directly, as they occur, in the field.

These can take place either "on the spot" or on the move – e.g. by 'tracking' people:

- *selective observation*: as described by Lynch (1976), this type of observation is, by its very nature, narrow in scope, but because of this, is rapid and effective. Selective observation analysis considers the physical setting as something which blocks or facilitates intended human activities, e.g. finding the entrance to a forest site. It focuses on the 'cause and effect' phenomena that are related to the spatial structure of the setting and all the physical elements within it.

- *'natural' experiments*: this is another technique described by Lynch and Hack (1984). This is the means of uncovering causal links by comparing behaviours before and after an environmental or human change has occurred – e.g. differences in 'arrival' behaviour when the entrance ticket hut is open/closed.

- *behaviour settings*: this is a survey method first developed by Barker (1968), and later described for application by site planners and designers by Lynch (1976, 1984). This type of observation identifies general patterns of behaviour 'bounded' by spatial and temporal parameters, and divides the environment into an array of 'units' accordingly, e.g. cars arriving at the entrance when the ticket hut is closed.

- *behaviour circuits*: this interlinks with the behaviour setting survey and was first described by Perin (1970) as a means of breaking down the unit of an activity from the user's point of view: by observing and tracking people the 'round of behaviours' from start to finish can be identified as a sequence of 'smaller' environment-behaviour interactions that construct the whole activity.

ii) indirect observation.

These are techniques used to study the *effects* of behaviour. These are unobtrusive measures and, in the current study, were employed to construct a 'picture' of the user's experience of place. These techniques are particularly useful where it is either impractical or unsafe to make direct observations, but also they are used to 'simulate' the user's experience – in this instance the route experience and the user's experience at site on arrival:

- *role play*: this is a technique employed to “imitate the processes of a system to try to see how it works” (Robson, 1993). It is the projection of the researcher ‘inside’ another person or situation. For this project, role play was used to re-enact the route experience along the road and to role-play specific ‘finding’ and ‘using’ tasks, e.g. finding the visitor centre from the car park.
- *trace behaviours*: this is the ‘evidence’ (Cooper and Carolyn, 1998) of actions carried out by users e.g. foot erosion, car tyre marks, which in themselves can be meaningless, but when read in the context of the environment-setting can be indicative of a ‘usability’ issue on site, e.g. paths most favoured by users across a site may not be the one the designer intended visitors to use.
- *informal interviews*: in addition to the formal visitor interviews carried, some informal interaction occurred with visitors whilst conducting the surveys.

iii) *Scenario analysis*

The scenario⁶ concept was used in the current study as an ordering tool for focussing and structuring the environmental survey. Scenarios describe an anticipated or a desired use of a system and provide the ‘units’ for analysis. The descriptions are of a person’s interaction with a system – in this case a forest wayfinding system. In the current study ‘route scenarios’ were described and used to focus the environmental survey on the user’s interaction with ‘the system’. For example route scenarios such as ‘approaching the site from the M4, junction 40’, or ‘approaching via Aberfoyle’.

Scenarios were also described *on site*: typical ‘first time user’ scenarios were identified, for example ‘finding the toilets from the car park’, and used to structure the study on site. The process of describing scenarios forces the researcher to focus on the user/environment interactions required in order to accomplish the task in hand (Gough *et al*, 1995). In this way, the survey along the routes to site and on arrival at site can be structured.

Finally, scenarios are a useful tool for comparative analysis. In the current study this was used to compare routes in wayfinding systems that work well and those that do not work well.

iv) *Spatial-behaviour analysis*

The concept of ‘spatial-behaviour’ analysis was first described by Lynch (1976). It combines all of the above described observation based techniques with spatial analysis, in a combined design/research approach. In the current study, the ultimate objective was the extraction, analysis, and interpretation of the information contained in the spatial-setting that helps (or hinders) the user to accomplish the wayfinding task in hand, leading to the identification of problem ‘types’, leading to potential design solutions. For this an integrated design-research method⁷ was used to ‘map’ the wayfinding experience.

Typical routes to site are identified and visually recorded by role-playing the wayfinding activity. The data is in visual form, mainly photographic image sequences with some sketches and

⁶ The use of scenarios in this sense is not to be confused with the more conventional use of ‘scenarios’ in landscape architecture (and forestry) where it is used as a means of anticipating future changes in *physical* appearance. In this study it is used as a technique for identifying user requirements.

⁷ an approach currently being explored by K. Southwell – PhD thesis 1999 to date.

diagrams. The data is collected with the specific intent of recording the environmental experience on the one hand, and the signage/information provision on the other.

At the desk study stage, photographic sequences are compiled using PowerPoint image sequences. These sequences 'reconstruct' the routes to site and record the signs and so are effectively simulations of the real-life experience on the one hand, and a catalogue of signs on the other. The data is compiled into 'image data sheets'. By combining 'experiential' data and 'factual' data at data collection stage, and later separating it out at processing stage, it is possible to compare signage provision with what is actually visible in the driver's line of sight along the road, and on arrival.

The data was used for comparative analysis with visitors' perceptions (as identified from the visitor survey) to gauge the level fit between signage needs and signage provision. In combination with the interview survey, spatial-behaviour analysis was used to identify *where* the user problems lay, and to explore the specific nature of the problems using the design approach. In this way, problem types could be analysed, and possible solution types identified.

The following provides a description of the type of analysis which contributed towards the development of a site managers' 'toolkit'. The analysis is described as follows in the context of this PhD for demonstrating a contextualised approach to research which utilises integrated spatial-behaviour analysis.

9.4 THE UTILITY OF INTEGRATED SPATIAL-BEHAVIOUR ANALYSIS (IN REAL WORLD RESEARCH)

Different types of analysis took place according to the scope of the information gathering and the tools used to record and analyse the data. The table below outlines three key wayfinding user-led tasks which might be said to 'connect' the entire wayfinding 'system' (levels I-IV in the wayfinding sequence). The tasks themselves structure the analysis, loosely based on 'facet' theory approach ('user-led' tasks) and the information gathering was structured using survey methods appropriate to the task in hand. To facilitate information gathering certain methods, tools and techniques became useful knowledge 'integrators' and 'generators'. These are outlined below in the right hand column, where four in particular are specified as having particular utility for certain aspects of the analysis: 'sequence diagramming', 'thresholds', 'theoretical comparisons' and 'behavioural indicators'.

level in the wayfinding sequence:	user led task:	information gathering survey method /knowledge integrator/generator (and behavioural observation techniques):
I – Pre-arrival information and visitor expectations	‘finding <site location>’	sign survey/ sequence diagramming (see 9.4.1 below)
II – Approaching the site		route mapping/ ‘thresholds’ (see 9.4.2 below) (using and view from the Road (“VFR”) spatial/behaviour dynamic mapping method + role play)
III – Site entrance	‘finding <entrance>’	route mapping/ ‘theoretical comparisons’ (see 9.4.3 below) (using VFR spatial/behaviour dynamic method + selective observation for tracking + natural experiments + role play + trace behaviours)
IV – Arrival and on-site experience	‘finding <key facility>’	site mapping / ‘behavioural indicators’ (see 9.4.4) (using spatial/behaviour sequence mapping + tracking + role play + trace behaviours)

The remainder of this chapter will attempt to explain the utility of integrated spatial-behaviour analysis in the wayfinding study, focussing on the aspects of the study outlined in the table above. The information gathering and analysis took place within the mode of operation described by the design process ‘methodology’, however, in this study ‘landing/grounding/finding/founding’ become subsumed within the overall analysis and it is difficult to extract these as discrete procedural stages. However, all levels of the wayfinding experience pass through ongoing cycles of analysis which begin with first impressions of i) the landscape setting, ii) the route experience, iii) the entrance experience and iv) key site issues, when arriving at site for the first time; then each level of the sequence is followed through with cycles of thinking during ‘grounding’ and ‘finding’ as the landscape setting/key routes/entrance/areas of site are re-visited and re-analysed, until finally, ‘founding’ occurs when some concrete design criteria are established, and the final form of the ‘toolkit’ formulated.

Information gathering

In the forest wayfinding project first impressions (when ‘landing’) were instrumental in

structuring the information gathering process. Although, in general terms, a fairly strict data gathering protocol was followed to ensure that each site was surveyed using the same approach, as described by 'the environmental survey' methodology (quoted above), there was flexibility in the system. As explained in the methodological description a set of 'experiential data was produced. What was not explained was that there were two 'layers' of information within this data-set: firstly, photographic recordings in a 'view from the road' approach produced to capture the landscape *as experienced* along the key roads to site (level II); the entrance arrival experience in each direction of travel (level III); and the main visitor arrival and central information points (level IV). This set of data may be considered the 'system image' data.

The second 'layer' of information was more detailed, highly situational, and structured according to the type of issues arising on site. This is essentially where theory generating takes place and where 'image' data is integrated and/or generated for 'test' purposes. During phase one of the study the problems were established by knowledge gained from a combination of visitor interview surveys, interviews with site managers, by observations, or by the researchers' own experiences. Because each site presented a set of unique set of conditions, with different wayfinding problems and potentials arising at the time, observations were being processed internally, producing 'design hypothesis' in an ongoing cyclical process of information gathering and hypothesis testing. However, during phase two of the study, data gathering and processing became more 'scientific' in two ways: firstly there was a more conscious effort to ensure that sufficient data was gathered for later analysis during a desk study to allow for a more detailed level of study than the first phase provided; secondly there was greater separation between the interview survey data and the 'environmental' data to try and gain a view of any discrepancies between 'expert' opinion and the users' perceptions. This also provided an opportunity to 'test' the utility of spatial-behaviour analysis as a research tool in its own right.

Applicability issues

During the first phase of the study, this researcher was both interviewing (informal approach) and conducting spatial-behavioural analysis, there was much interplay back and forth between identification of a suspect problem on site, for example, and analysing the nature of the problem by adjusting the questioning process accordingly. For example, an expert/user discrepancy occurred where users stated that they had had

no problem in finding a car park from a particular entrance, whereas the researcher had observed people having problems; in this instance she would probe people further on this point, until an explanation was found. For example, a particular entrance made it difficult for users to find the car park but because there was a manned ticket hut located near the entrance open at certain times of the day, visitors were able to ask for help, or even simply follow other users during busy times, and so in this instance 'the problem' existed, but its boundaries were 'temporal'.

For the second phase of the wayfinding study, this researcher was not generally conducting the interviews, (although the observations on site were generally conducted in a 'participant observation' mode of application). But because of the non-involvement in the interview process, initial 'problem setting' occurred independently. Even if key interview findings were communicated between the researchers, as was often the case, it generally occurred after some independent impressions were made.

'Evaluation-in-action' helped to generate individual 'system image' models (the site specific wayfinding experience), whilst at the same time in the background 'testing' the validity of the generic four stage sequence model (and thus its utility as a model for *explaining* and *predicting* the generic wayfinding experience across all sites).

Using some selective analysis, key emerging issues are discussed, with an attempt to highlight the relationship between the knowledge generated (and integrated) and its emergent theory and methods.

9.4.1 *Survey method - **sign survey** (Level I)* *Key user-led task: 'finding <site location>'*

A 'factual' audit of signs took place which recorded sign locations and sign content, along each key route to site, and at site around the main arrival 'reception' area.

Sign survey

The sign survey is a combination of 'sign audit' and a 'route survey'. The former provides a full audit of signage provision whilst the latter provides an audit of visual access to signs, that is, signs which are *visible* in the driver's 'view from the road'. The survey is divided into two parts. One part of the survey is conducted along the road as far as the entrance (part A), and the other is conducted in the immediate arrival area (part B). The method is explained in **plate 9.4.1/Sign survey**. An information survey of all key sources of leaflet-style and map information was also conducted.

**PART A): SURVEY
KEY APPROACH
ROUTES**

STEP 1: Identify key route/s, and key point to start the sign survey (visitor survey - key question 2 a) and b)

Approach route <A470 from the north > —————> Entrance



STEP 2: Record signs 'as experienced': identify visible signs by role-playing the route as if you were a first-time visitor.



STEP 3: Audit the signs: go back over the route slowly (on foot if necessary) to log and photograph all signs in their location, and make a photographic and/or written record of the sign content.

STEP 4:
Catalogue
the signs.

SIGN INVENTORY			
Coed-y-Brenin approach/arrival routes			
Approach route:	Sign inventory number:	Sign description:	
Approach no 1 – 'A470 from the north'	N1	FC advance warning sign – green + FC 'crown' (same look as threshold signs): 'Comisiwn Coedwigaeth Coed y Brenin 1 milltir/ 1 mile' + 3 symbols – mountain biking/cup of tea/information	

Plate 9.4.1/Sign survey : The sign survey: example from Coed y Brenin. There are two parts: A) a survey of key routes to site (illustrated here) and B) a survey of key arrival areas on site.

High consistency of signage/informational content and style emerged as a key criteria for the design of a wayfinding system. In particular at this level (level I) in the journey, users were looking out for (ie 'visitor expectations') the name of the site, eg 'Coed y Brenin' and/or its main activity eg 'mountain biking centre' to appear in signs as a first sign of reassurance that they are on the right road in the first place. Alternatively, users just passing by were drawn in from 'seeing' something from the road. In this situation the journey does not begin at 'home', but on an approach road, or by the entrance. Thus the whole signage system must be assessed for level I.

Although sign content works in conjunction with user expectations, sign placement and the physical spatial arrangement of the site in relation to the road communicates a message of its own. Thus, for the purposes of identifying whether there was, or was not a problem related to the sign content, assessment of this particular *aspect* was useful.

Tool no. 1: 'Information/sign-line' SIGN CONTENT

This tool (see **plate 9.4.1/Tool no.1**) assesses the consistency of information provision in the sign content as compared with other pre-arrival sources of information in circulation - in print, on the internet and by word of mouth. It assesses informational consistency throughout the journey from pre-arrival, along the route and on arrival at the entrance. The example represents a 'good' system in terms of sign content – with high consistency in use of its visual graphical language. This produced a 'streamlined' experience with good 'connectivity' in the use of its system.

It was found that even a highly complex route system could be easy to use if it was well signed. Furthermore, an easy to use route was also easy to describe. For example when visitors were asked to describe the journey to site as if to a first time user, where visitors were able to provide instructions such as 'just follow the signs', this could be correlated with good consistency, whereas a description such as 'take M4, Junction 40, brown sign then go through two roundabouts, up valley, past big rock....travel on a bit and turn right into the site' could be correlated with a highly 'branched' sign line.

A complex route can only be easy to use if the signs are *also* in the right place, but the method is simply intended to help in problem diagnosis.

'pre-arrival'
information'

Approach route <from Pickering to Pexton Moor toll gate>

Entrance



Sign audit
inventory ref no:

All
sources



Dalby
Forest
Drive

Dalby Forest
Drive
(Toll)



Low Dalby
(Forest Drive)

Dalby
Forest
Drive



Dalby Forest
Drive

North
Riding
Forest Park

STEP 1: conduct
information search and
sign survey of key
approach route ('visible'
signs only)

STEP 2: Construct
'information/ sign-line' --
drawing branches where new
information 'streams' are
introduced.

STEP 3:
Rate the site
and identify
problem
type.

This site rates high because the 'sign
line' is very 'streamlined' (ie not very
branched). The sign content is very
consistent in style, wording and use of
symbols and so the road signs to this
site may be used in developing design
guidelines as a 'model' example.

DESIGN
GUIDELINES --
road signage -
content

Plate 9.4.1/Tool no.1 :-
'informational consistency': a
model example from a Phase I
case study - Dalby.

The key issues at this 'level' in the wayfinding sequence were summarised in the wayfinding study report as follows:

LEVEL I –	Pre-arrival expectations and visitor information
The decision:	<p>the decision to visit (pre-arrival). There are two types of decision to visit – one made before leaving home and the other made 'just passing by'. Each visitor type is responding to a different set of cues</p> <p>a) the first is looking out for predetermined destination names from the signs, route names and landmarks</p> <p>b) the second is mainly responding to information about a key activity or opportunities, such as a café, or place to have a picnic.</p> <p>In the former case, the user has planned a route and is seeking information that matches the information they had received pre-arrival; in the latter case, the user is 'selecting' information that satisfies a need that is linked to the context of the site's setting (e.g. on a busy main road the user needs a 'pit stop'; in an area of scenic beauty users are looking for scenic spots; in the Welsh Valleys users are seeking cultural heritage).</p>
Key wayfinding task:	deciding on the approach route for finding the site
Theoretical background	<p>informational consistency – signs providing information that fits within the context of the whole information system and provides the right information</p> <p>sign content: a good signage system allows for the limitations in human capacity for taking in information at a glance.</p> <p>Passini (1992) : wayfinders are actively seeking/receiving selective information.</p>
Key problems from case studies:	<p>a) route planning: information provided at the outset (pre-arrival) on route choice and on what to look out for along the way and key place names nearby, quite often conflicted with information provided in the signs along the route;</p> <p>b) route unplanned: a key activity, or key feature of a site, very often was not communicated in the signs.</p> <p>Thus, users had problems either a) finding the site or b) gaining reassurance from the signs that they had arrived at the right place.</p> <p>Sign information was often cluttered by too many colours, inconsistent style, and too dark or too small lettering making them hard to read. Symbols being too small, not emphasising key attracting feature, added to the clutter.</p>
Key user needs:	<p>There needs to be a close match between the sign content and what is provided in key marketing literature about the name of the site itself; in addition key place names nearby, road junctions/names and other key physical landmarks, which are actually visible from the road, should be emphasised in the leaflets. In addition, the information needs to be visually accessible and readable at a glance, with a high degree of consistency both in graphical content and in 'visual language' used – i.e. style, colour and use of symbols.</p>
Key criterion: sub-criteria:	<p>CONSISTENCY</p> <p>visual clarity; visual accessibility</p>
Methodological issues:	<p>Problematic: the site manager has to assess the two decision types separately:</p> <p>a) Planned visits - Assessment of signage content in the <i>context</i> of the</p>

Development of assessment tools:	<p>whole wayfinding information system, in other words, signs and the environment itself <i>vis a vis</i> leaflets, verbal and other existing road signs.</p> <p>b) Unplanned visits - Assessment of signage in <i>context</i> of the background landscape experience, according to different behaviours e.g. long distance driving; the scenic tour.</p> <p>Assessment of existing information and signs in relation to the two design types identified above.</p>
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The sign-line tool does not enable the forest manager to assess whether the signs are located in the right place and/or where to place a sign when planning a new system. ‘Route mapping’ became particularly useful for exploration of this aspect of wayfinding.

9.4.2 *Survey method - **route mapping** (Level I/II)* *Key user-led task: ‘finding <site location>’*

To contextualise the analysis, two examples are first provided to explain the key methodological issues arising, when dealing with contextual data, and how problem setting, information gathering and knowledge generation/integration became inter-related, for analysing a site using, a ‘route mapping’ method. This is effectively the ‘view from the road’ approach to analysing a route, embodying the behaviour setting and behaviour circuit approaches, and conducted with forest wayfinding needs in mind.

The most obvious experiential problems and potentials of the ‘region’ were identified during ‘landing’ and this produced a visual interpretation of the landscape, complemented by a written explanation, summarising the problems and potentials concerning landscape experience, activity patterns, wayfinding issues and approach routes. Such summaries were presented in the report as follows:

1 ‘Afan Argoed’.

The following description complements **plate 9.4.2/AFAN** and describes the main approaches to the site known as Afan Argoed and located in Wales.

<p><i>Landscape experience</i></p> <p>The route experience on approaching this site is affected by a combination of factors in the physical and cultural landscape. As the visitor drives through the valleys, the roads swing left and right, and make sudden descents and ascents. Furthermore, these winding routes pass in and out of tiny pockets of settlement. These settlements are a legacy of the mining industry in the area, and are a significant factor in the route experience: it is one dominated by sudden and frequent changes in speed limit as the driver passes briefly in and out of residential, designated-speed zones on national speed-limit roads.</p>
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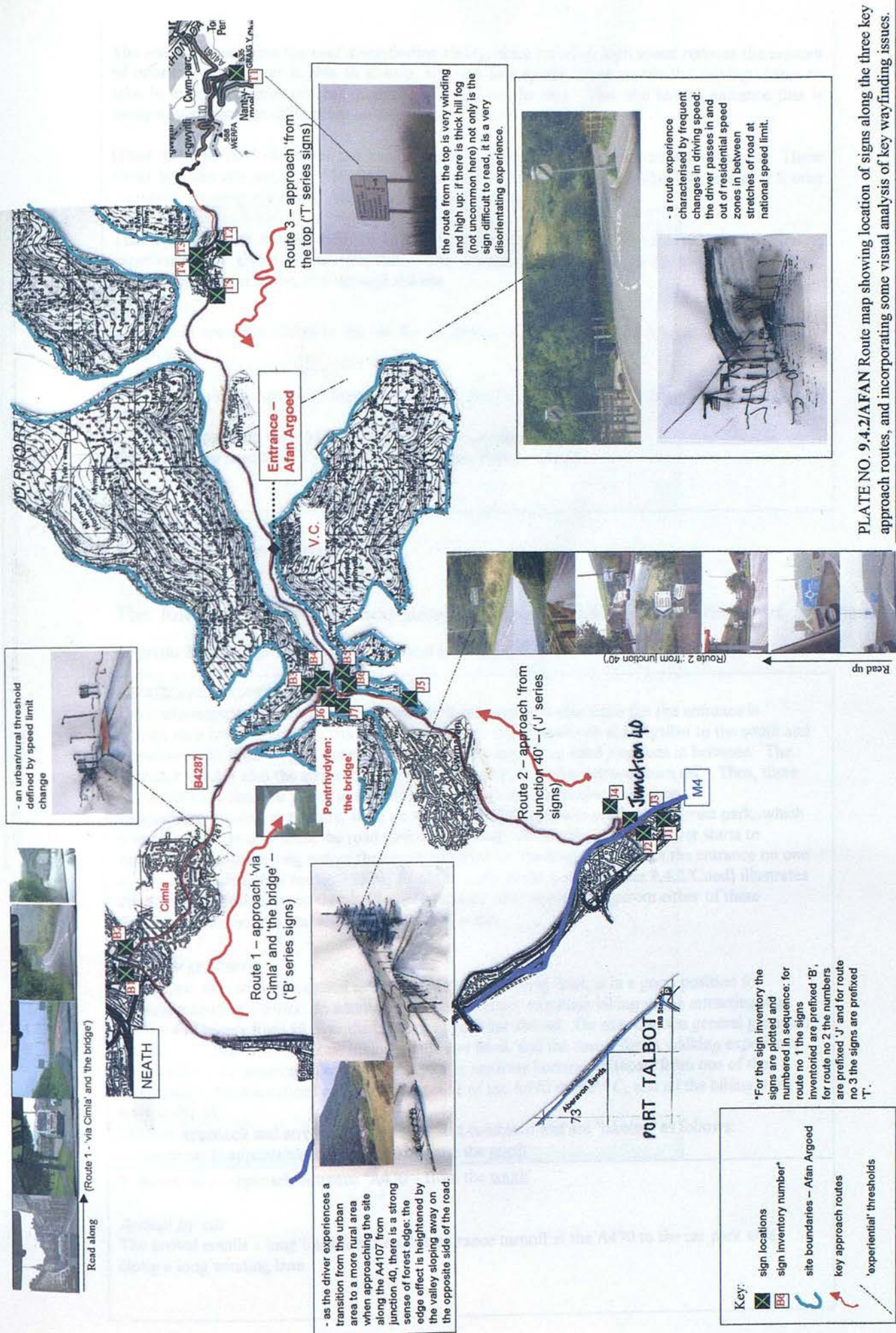


PLATE NO. 9.4.2/AFAN Route map showing location of signs along the three key approach routes, and incorporating some visual analysis of key wayfinding issues.

The speed zones affect the user's wayfinding ability, since travel at high speed reduces the amount of information the user is able to absorb, whereas low speed zones enable the driving visitor to take in critical information that might help in finding the site. This site has an entrance that is easily missed because of its siting on a bend, on a fast road.

[Plate 9.4.2/AFAN] illustrates the winding nature of the road network across the valleys. These roads link the site with the M4 motorway and other key trunk roads. The M4 acts as a tourist 'conduit', bringing visitors to Afan Argoed from England.

The legacy of the mining industry is a key factor, not only affecting the driver's wayfinding experience, but also the walker/cyclist. The disused railway lines are an integral part of the walking/cycling routes to, and through the site.

Three main approach routes to the site for car-drivers were identified and labeled as follows by the researchers:

Route 1 – Bridge. Approach from Briton Ferry, B4287, Cimla, and the bridge at Pontrhydyfen, A 4107

Route 2 – Approach from M4, junction 40 and Cwmafan, A4107

Route 3 – Top road from Cymer and the Rhondda Valley, A4107

2 'Coed-y-Brenin'.

The following description complements **plate 9.4.2/COED** and describes the main approaches to the above site, located in Wales.

Landscape experience

The route experience on approaching this site is reasonably simple since the site entrance is located on a long stretch of a trunk running between major junctions at Dolgellau to the south and a junction near Ffestiniog to the north, with no other significant road junctions in between. The approach road is also the arrival road since it leads directly to the entrance turn off. Thus, there are no difficult decision points in transitioning through the wayfinding sequence approaching/arriving at this site, once on the A470. This is a particularly large forest park, which is apparent to the user since the road runs right through the middle of it: the driver starts to experience the forest long before the actual entrance, on the long run towards the entrance on one of two approach/arrival routes – either from the south or the north. [Plate 9.4.2/Coed] illustrates the points at which a forest threshold is experienced when approaching from either of these directions, and the role that signage has to play in this.

Activity patterns

This forest site, with its location along such a key connecting road, is in a good position for attracting touring visitors. In addition, the site is a major mountain biking venue attracting high numbers of bikers from all over the country and further abroad. On site, the two general groups of needs – the organised mountain biking on the one hand, and the casual forest walking experience on the other, are physically (spatially) completely separate because all (apart from one of the walks) begin from locations on the opposite side of the A470 to the VC, and all the biking trails start at the VC.

The key approach and arrival routes are in effect combined and are 'labeled' as follows:

1. Route no 1: approach/entrance 'A470 – from the north'
2. Route no 2: approach/entrance 'A470 – from the south'

Arrival by car

The arrival entails a long transition from the entrance turnoff at the A470 to the car park area, along a long winding lane.

Finding the entrance

The entrance was analysed in each direction. It was noticeable that when arriving from the south, because of the nature of the road and the road/entrance layout, together with the high road speed limit, the user has less time to react than when approaching from the north. However, in both directions the visitor had already been provided with 1 mile and ½ mile advance warning signs: these were visually accessible and very clear – a simple visual language.

From both directions the signs provided information appropriate for the speed of the road – using a simple visual language and clear white lettering on the bright green title ‘strip’ which stands out better against the forest back drop than the dark green. The signs were visually accessible, i.e. not obscured by tree/shrub growth or in a bad position. The repetitive use of three simple symbols provides key information (mountain biking/café/tourist information) and acts as an orientation aide. This visual ‘language’ is repeated on the entrance sign and on the signs located along the entrance/arrival transitional link road.

Generating data-sets

The two plates **9.4.2/AFAN** and **9.4.2/COED** illustrate how, for each site, the same protocol for data gathering was applied for generating data-sets which produced ‘view from the road’ *experiential* image sequences and *factual* sign survey images: these comprise the ‘image’ data. In addition other sub-sets’ of data (which might be considered the ‘test’ data) emerged where a particular design hypothesis was being tested.

At this stage, a design hypothesis was generated concerning the relationship between the landscape setting and the different functions of ‘reassurance’ and ‘directional’ signs. According to the literature, we rely heavily on ‘directional’ signs when moving at speed along the road because we have no time to develop a cognitive map of the area⁸, whereas ‘reassurance’ signs simply reinforce our decisions. This researcher hypothesised that the use of reassurance signs could be minimised and/or used more effectively through good use of the landscape setting itself and that ‘threshold’ in particular had a key role to play in defining where signage should be placed.

Thresholds and reassurance signage

The two plates (**9.4.2/AFAN** and **/COED**) show sub-sets of data used to analyse the role of ‘thresholds’ in the ‘system image’. It became apparent from initial impressions that critical points occur where one’s wayfinding experience begins to ‘shift’ through the wayfinding sequence from a *general* sense of ‘approaching’, to a sense of ‘arriving’, as the cues become more *specific* and detailed. These ‘shifts’ were structured by a combination of spatial form, spatial ‘content’, signage and the need ‘to find’.

⁸ JAKLE, John, A, The Visual Elements of Landscape. The University of Massachusetts Press, Amherst, 1987

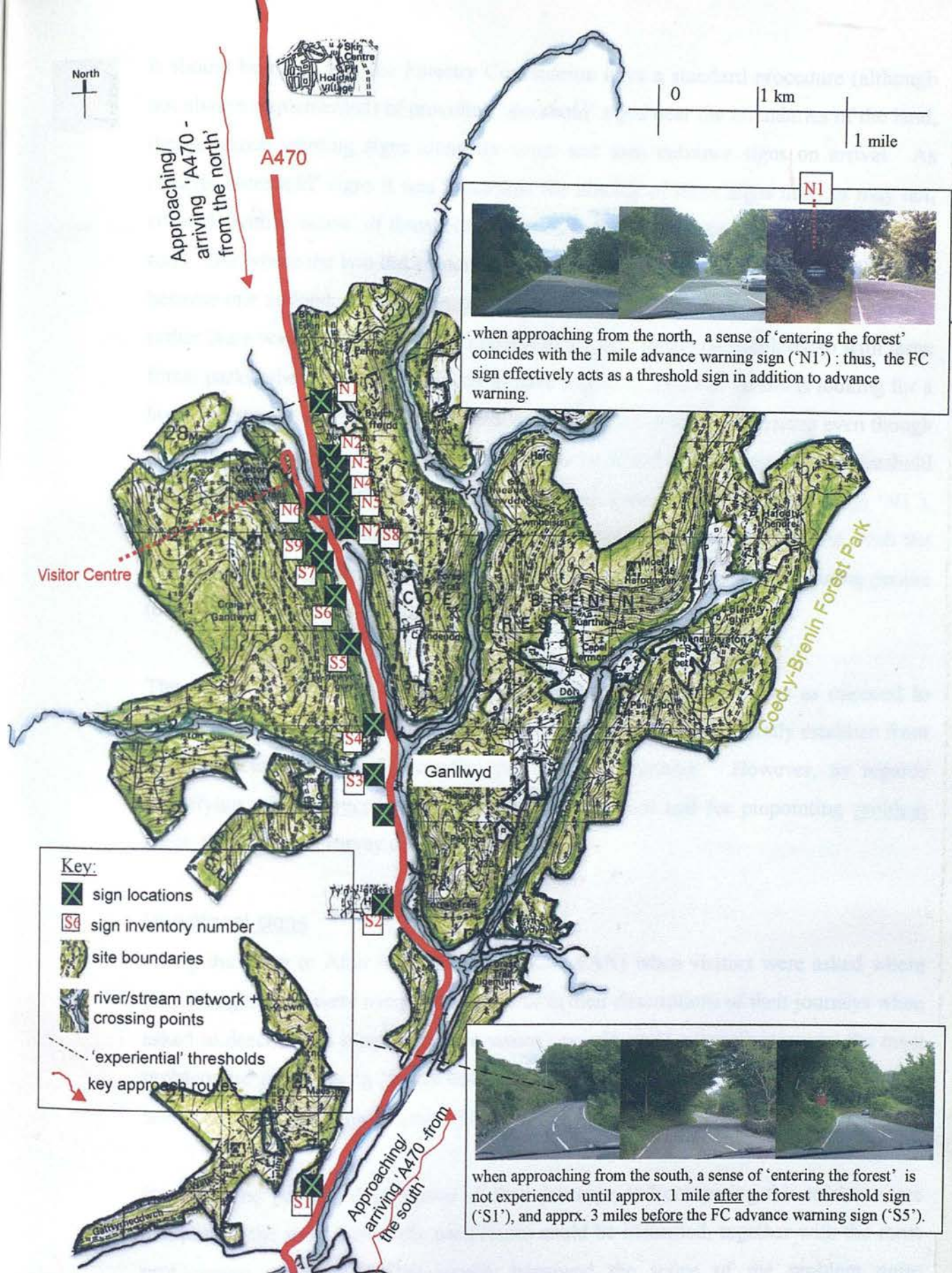


PLATE NO. 9.4.2/COED : Route map <Coed y Brenin> showing location of signs along the two key approach/arrival routes within the boundaries of the forest park. The image sequences highlight 'experiential forest thresholds' – ie the point along the route in each direction of travel where there is a strong sense of 'entering the forest', as compared with where the threshold signs are actually located. The map also illustrates how the forest landscape is structured by the A470 road and the river network running through it.

It should be noted that the Forestry Commission have a standard procedure (although not always implemented) of providing 'threshold' signs near the boundaries of the land, then advance warning signs along the road, and then entrance signs on arrival. As regards 'threshold' signs it was found that the placing of these signs may, or may not, coincide with a 'sense' of threshold, if not, such signs 'disappeared' into the side of the road. But where the two did coincide there was a much more powerful sense of arrival because one no longer felt that one was simply approaching in the *general* direction, but rather there was a sense of being on course to arrive. This is particularly so with large forest parks where the driver is likely to have a general idea that he/she is looking for a large forest area, and so this first threshold point signals a sense of arriving even though the actual entrance to the car park still had to be found. Thus, where such threshold signs are placed to work well with the landscape, (see **plate 9.3.3/COED** sign 'N1'), they can combine in function as advance warning signs of the entrance, and, with the right information presented clearly, can provide a 'decision space' for allowing people to make up their minds whether or not to stop and spend time.

The means of identifying the location of experiential threshold points as opposed to 'political' boundaries would be very difficult, if not impossible, to firstly establish from an interview survey and secondly 'prove' their existence. However, as regards identifying where directional signage should be placed and for pinpointing problem spots, the interview survey could be used.

Directional signs

Along the route to Afan Argoed (**plate 9.4.2/AFAN**) when visitors were asked where they thought signs were needed most, and/or in their descriptions of their journeys when asked to describe 'as if to a first time visitor', people could generally pinpoint the most problematic junctions eg 'at the M4 junction' or 'the Aberfoyle junction'. However, users could not generally pinpoint the specific *nature* of a problem.

By recording peoples descriptions of their journeys and comparing this to the 'route mappings', the most frequently used routes could be identified, together with the most problematic junctions. This usually narrowed the scope of the problem quite considerably and this allowed for detailed analysis. When role-playing the problematic road junctions, it was often found that in fact there was a sign, but it was lost in a clutter of other signs, or lost in the bushes. Thus, users were either a) expecting signs which

did not materialise or b) signs were present but were not noticed because they were positioned slightly out of the driver's view.

On further analysis, it was found that even in the absence of a key directional sign, if a reassurance sign been provided on turning, one's sense of uncertainty is quickly assuaged. At some sites it would have been difficult or impossible to provide signage where most needed, but the placing of a reassurance sign after the junction would provide a compromise solution. Such signs could also have a dual role as 'threshold'. The key issues became summarised in the report as follows:

LEVEL II –	Approaching the site
The decision	the decision to find
Key wayfinding task:	finding the approach route to the site
Theoretical background:	sign location: “Wayfinding is spatial problem solving”. (Passini, p167) [sign content : Driving along a road at speed, we depend heavily on directional signs because we have no time to develop a cognitive map of the area (Jakle 1987).]
Key issue:	route complexity – the right sign in the right place improves route connectivity
Key problem:	visitor confusion occurs because key decision points are not always signed. A typical point of confusion is at a junction which connects a key feeder road from the regional/national network with the local roads and/or approach route to site – users <i>expect</i> a sign. Failure to sign at such a key junction disconnects the user from the rest of the wayfinding system. This omission can make a site complicated to find, even if it is not a particularly complicated road system. Signs which are damaged, dirty or obscured by tree growth, may not be registered by road users. There needs to be a directional sign to ‘connect’ the user with the approach route from the key junction.
Key user needs:	The sign needs to be in the line of sight of the user arriving from a <u>key</u> direction of travel. There also need to be some sort of reassurance sign following the decision point. This can be assessed for placement and visual accessibility as per the directional sign.
Key criterion: sub-criteria:	CONNECTIVITY; consistency; visual accessibility; visual clarity
Methodological issues:	1. By asking visitors ‘how would you describe route to first time user’, an indication is given of the key approach routes which may justify analysis. 2. Not all road junctions present a decision point. This can be judged by ‘role-playing’ the route experience or using space syntax.
Development of assessment tools	Assessment of key decision points and sign placement in relation to them.

This led to the development of the second tool for the forest mangers toolkit:

Tool no. 2: 'Decision tracking' - SIGN PLACEMENT

This tool (see **plate 9.4.2/Tool no.2**) assesses signage at key junction point/s key feeder routes connect with the local route network, in the *key* direction of travel. It examines the effectiveness of *directional* and *reassurance* signs at these points.

This tool helps forest managers identify: 1) goodness of fit between location of directional and reassurance signs in the given road network; and 2) goodness of fit between sign position and the driver's view from the road' (whether the signs are visually accessible and clear).

METHOD

'Decision tracking' is an 'in the field' survey method. The aim is to a) identify problem spots along the route and b) identify if the problem relates to a lack of signage - directional and/or reassurance signage; or c) whether problems are directly related to lack of sign visibility– whether it is sign clutter, tree growth, bad positioning.

The method entails a 'break-down' of the junction turn-off experience, 'step by step'. The tool uses the sign survey, interview survey findings, and 'role play'. This tool enables the forest manager to identify problems related to the siting of signs.

Even if it is easy to find the approach route, and the signs are highly consistent in their content, and placed to facilitated ease of route connectivity, it may still be difficult to find the entrance.

9.4.3 Survey method: *route mapping/ 'theoretical comparisons' (Level II/III)* ***Key user-led task: 'finding <entrance>'***

Grounded Theory suggests the use of 'theoretical comparisons' when we are stumped for explanation. Because details are not always evident to the 'naked' eye, there are times when we have to stand back and ask 'what is this?'. It is in the asking of this question that, according to Strauss and Corbin, we begin to draw on properties from what we do know to make comparisons. This can entail drawing on knowledge from observation, literature, and experience.

Comparative analysis was used to explain something unexplainable, and then test a design hypothesis which helped generate a third tool for the manager's toolkit.

STEP 1:
conduct sign
survey
approaching key
junction along key
approach route



Key approach route <via Aberfoyle -
from the south>

Aberfoyle junction

'minus'
= NO REASSURANCE SIGN

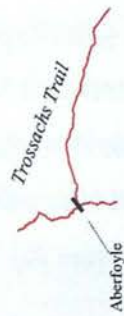
to entrance



STEP 2: at key junction
Identify whether the direction sign
is lacking altogether, or whether
it is simply out of the driver's line
of sight, lost in a clutter of signs,
or obscured by foliage. Break
down the turning sequence at the
junction, step by step



D⁻ = NO DIRECTION SIGN VISIBLE =
'minus'



KEY:

D = Directional sign (before
junction)
R = Reassurance sign (after
junction)

Ratings:

D⁺R⁺ = high

D⁻R⁺ or

D⁺R⁻ = medium

D⁻R⁻ = low

By making the appropriate
intervention, the directional
sign can be 'added' to the
route (**D⁺+1). In this instance,
the sign could be raised,
moved altogether and/or
other signs in the clutter
shifted slightly, or 'lined' up to
make the signs easier to read
at a glance. A reassurance
sign at the turn would
improve the situation and
could provide a compromise
solution, if impossible to
improve the directional sign
(**D⁻R⁺+1).****



STEP 3: rate the site and
identify problem type

Low rating:
D⁻R⁻

A problem
of sign
clutter



**DESIGN
GUIDELINES -**
road signage -
placement

Plate 9.4.2/Tool no.2 :- 'route

connectivity' along the road to Queen
Elizabeth Forest Park - a case study
from Phase I.

When assessing this key junction point at Aberfoyle, the driver's route experience is tracked back to the point where the key junction comes into view: the route experience is role-played as if for a first-time visitor. In this instance it was found that a key directional sign 'disappears' in a clutter of other signs, and on taking the turning towards the Visitor Centre, there is no reassurance, or any other sign such as advance warning which might act as reassurance. Thus, this site rates low on sign placement at key junction 'Aberfoyle'.

Explaining the unexplainable

The interview survey conducted at a site known as ‘Moors Valley’ gave no indication of there being any problems with the entrance layout to a particular site, nor its signage (figure 9.4.3.i). However, the observation based analysis indicated otherwise. On approaching the site, visitors’ car break lights would come on suddenly at the entrance, then their indicator lights would start very late in the manoeuvre, and more often than not visitors would make a sharp turn, or sudden swerve, on entering the site.

A local resident suggested to the researcher that there was a near accident taking place every ten minutes at this entrance. Also, ‘trace evidence’ on the tarmac showed tyre marks indicating sudden breaking whilst swerving into the entrance. However, most people in the interview said how easy the entrance was easy to find, that there were no problems and it was ‘all very obvious’.



Figure 9.4.3.i – The arrival experience at ‘Moors Valley’ forest park: visitors turning into this site were observed breaking suddenly in their cars and turning on their indicators when almost too late.

The interview question ‘did you have any problems finding the site?’ was not uncovering the fact that this entrance was ‘unsafe’. Even though this site had no trouble attracting large numbers of people, and something was prompting them to turn off at the right place (albeit at the last minute), the entrance could not be deemed ‘good’.

When visitors at this site were asked what prompted them to turn off, a significant number of visitors gave specific mention of the ‘big green sign’, and also some mentioned some wooden stumps around a grass verge as the cues which prompted them to turn. This site was also very well signed from key junctions, which visitors also made mention of, suggesting that this site provides good advance warning further back (this was also the researcher’s impression). This generated a design hypothesis that the entrance prompt was not specifically a sign, nor the entrance opening, but it is the point

at which the user gains sight of the two together. The problem with the Moors Valley example is that the entrance/sign prompt came up very late.

Towards establishing what constituted a 'good' entrance, one had to be found that provided an 'ideal' model. Since every entrance presents a different set of conditions eg fast road, slow road, bendy road, hilly, and so on, this initially seemed a pointless task. However, in looking for an entrance for comparative analysis with Moors Valley, the Coed-y-Brenin entrance provide a similar 'type' of setting and experience for the user and yet one which did not display the same behavioural 'indicators' of an unsafe entrance. (Figure 9.4.3.ii)

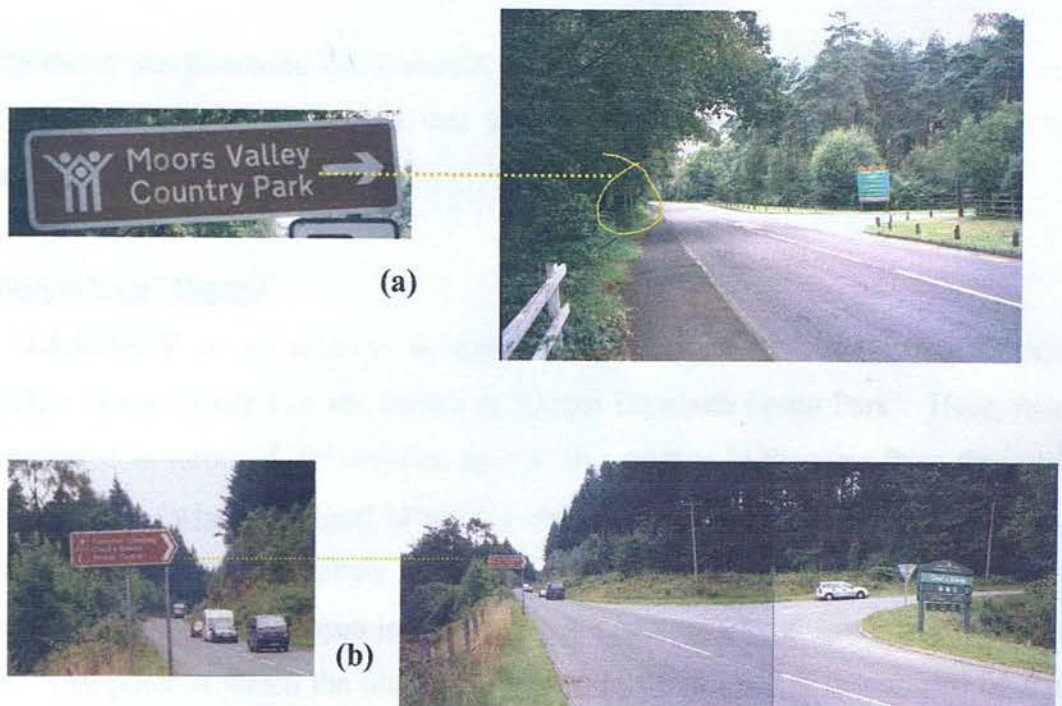


Figure 9.4.3.ii – comparative analysis of entrances of similar typology: (a) Moors Valley, (b) Coed y Brenin

Although Coed y Brenin is located directly on a main trunk route whereas Moors Valley is on a smaller road, and although each uses a different signage system- both seemed to provide prior advance warning, with clear and simple directional signs placed exactly where needed, with generally, a consistent use of colours, symbols and words, and seemingly appropriately sized for the speed of the road. (These particular signs are not illustrated). However, on closer analysis, the arrival experiences were quite different and much more complex than first realised. By highlighting the differences, one can understand more about what is really going on.

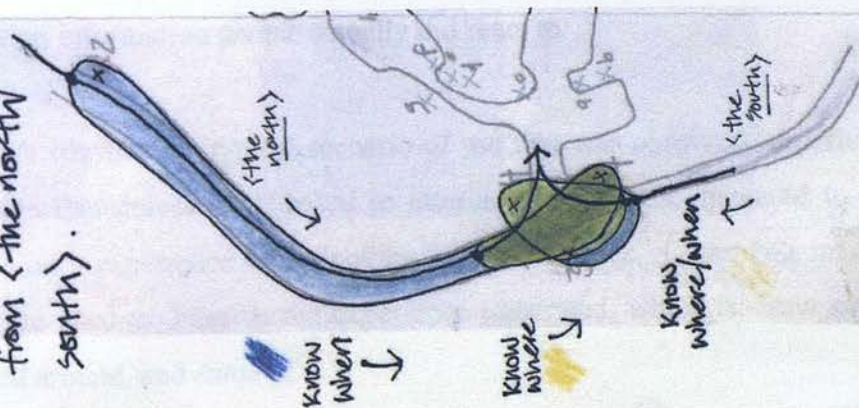
In the Coed-y-Brenin entrance experience, there is a brown sign opposite the site which is very prominent and in the Moors Valley example, which initially seems the same, the brown sign is completely visible in the view from the road. The role of this one sign in creating a safer entrance was dubious since the writing on the sign is not readable for the speed of the road. A further hypothesis was generated that since the previous advance warning signs provided to both sites was so clear along the road, the user would simply be looking for something 'entrance-like' in the first instance and wording on the sign, secondarily, particularly where there is good, clear advance warning, and one already knows approximately 'when' to expect the entrance to appear. However, until we gain visual access to an entrance, we do not yet know 'where' it is.

An hypothesis was generated that it should be possible to map these when/where 'states of knowing' in spatial terms, and that these could provide a 'spatial/behavioural' indicator of a good/bad entrance.

A "when/where" theory

Plate 9.4.3/QEFP is an attempt to map the 'knowing where/when' spaces that materialise along a route to a site known as 'Queen Elizabeth Forest Park'. Here, they are considered in terms of 'information spaces' that emerge in the view from the road firstly indicating 'when to expect to see the entrance' (an advance warning sign) and secondly when the cues strongly suggest 'knowing where the entrance is'. The 'knowing when' space is mapped in blue, and the 'knowing where' space is mapped in yellow. The point at which the blue space begins to be mapped is determined by the first point at which the first advance warning sign comes into view (at the driving speed of the road); the point at which the yellow space is mapped is the point at which the entrance comes into view and the boundaries of each are approximately the visual boundaries of the view from the road. Where the yellow and blue spaces overlap, a green space emerges and this is where a 'forestry entrance-like' opening together with entrance sign comes into view.

information spaces
for 'knowing
where/when to expect
when arriving
at <QEPF>
from <the north/
south>.

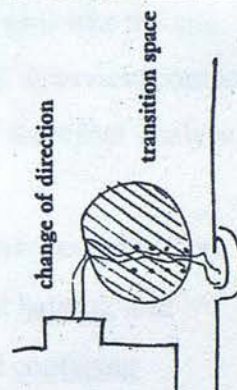


'worm'
= indicates
"good"

'blob'
= indicates
"bad"



Finding <Queen Elizabeth> Forest Park entrance from <the south>



Christopher Alexander's Pattern no 112: the transition space

Plate 9.4.3 /QEFP : Mapping the 'information/decision spaces' that materialise along a route.

When arriving from the south to this site, the entrance comes up suddenly because there is no advance warning. This creates a very ‘blob’ like blue shape that merges with the yellow (becoming green), whereas when there is advance warning the ‘knowing when to expect’ the entrance is a long blue ‘worm’ like shape because of the advance warning giving a longer lead in: this generates a transition space, or a space of ‘expectancy’ during which time the driver is *prepared* to turn, even though he/she does not yet know ‘where’ the entrance is.

It is notable that **plate 9.4.3/QEFP** includes an illustration of Alexander’s pattern no 112 – the ‘transition space’. This is intended to illustrate the transition space defining *itself* upon the act of entering.

When applying the same method to analysing the entrance to Afan Argoed an ‘inverted worm’ shape is generated. This is explained as follows.

Afan Argoed provides an example of a ‘bad entrance’ – one that is both difficult to find and unsafe, as was unanimously decided by the visitors, by observations and by the researchers’ own experience. The interview data (presented in Appendix A.3) highlighted the turn-off prompts that people said caused them to turn into the site. All of the data in the appendix illustrates the type of integrated interview/composite photo/sketch sequence that can be compiled to reconstruct, and therefore analyse the route experience. Such analysis could compare:

- what information people say they expected to receive but didn’t see;
- what information people say they did see and found helpful; and
- what information people say they did see but found confusing

WITH

- what was actually provided in terms of signage; and
- what information people actually did react to.

Plate 9.4.3/AFAN illustrates a typical scenario of use that was observed, experienced by the researchers themselves, and, based in interview comments, appeared to be a likely first time user’s experience when looking for this entrance. Comments made by “visitor aa004” are used to describe the experience illustrated, which is: ‘saw sign as drove past, turned around, and came in’.

The scenario if go straight past entrance? —

sign out of sight line



Read Along

visitor aa004: "saw sign for another parking spot 100m, thought it was that place."

saw sign as drove past

turned around

entrance

(anticipating turn ... 40mph?)

... and came in "

it clear veg, better view of entrance

better position / additional sign

Plate 9.4.3 /AFAN : a typical first time user's arrival experience (missing the entrance turn-off)



"inverted worm" shape

Point of confusion — 'Afan ahead' sign needed

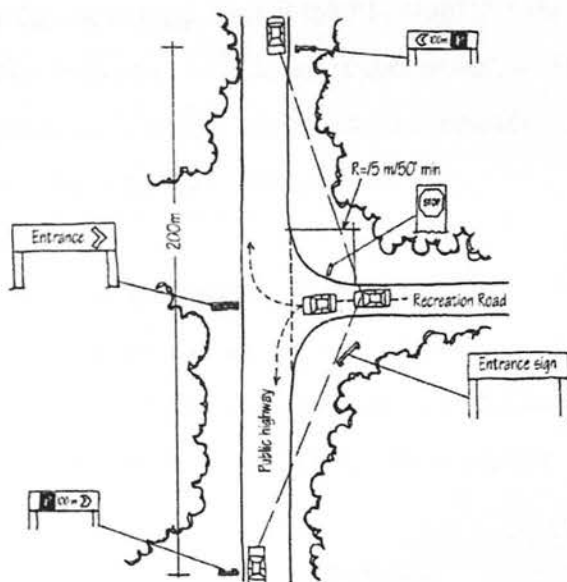


In the example of this 'bad' entrance, the scenario of use for the first time visitor is to fly straight past the entrance because the sign appears at exactly the same moment as passing the entrance, situated as it is, around a sharp bend in the road. By the time one has made a visual connection between sign and entrance, it is too late to brake. However, because in this example there is a place immediate after the entrance where people can turn around, this provides a convenient place to turn around.

Thus, when mapping the when/where states, a green 'inverted worm' shape appears which represents the space within which the user knows 'where and when' the entrance is – which in this case entails back-tracking and so this transitional space emerges after the entrance.

In the absence of advance warning the entrance sign took on added importance. The literature was turned to for some clues as to how to 'measure' quality of entrances in a more scientific way than 'blobs' and 'worms' provided.

Knowledge integration – design guidance



The layout of an entrance to a facility from a highway should combine an attractive landscape with the safe movement of vehicles. Signs, sightlines and road geometry must conform with safety requirements to reduce the risks of accidents in often unfamiliar landscapes and foreign countries.

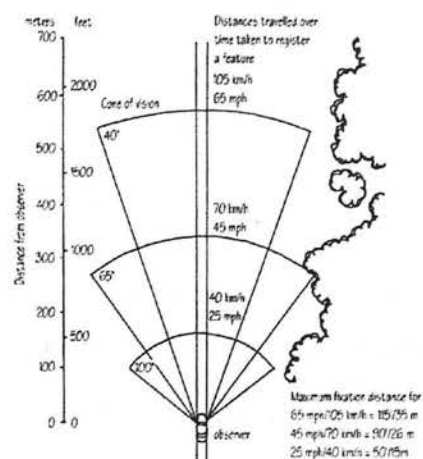
Figure 9.4.3.iii - Example of roadside landscape design for signage at the entrance area. (BELL, Simon, 1997, p31)

Existing design guidance in the literature on forest site design, provides a number rules of thumb for distance measurements, such as sightlines and road geometry.

Firstly, design guidance is based on an entrance layout that does not, and cannot take into account individual, site specific environmental variables.

Secondly, tables and diagrams in relation to reading distance (of signs) give guidelines derived from transportation studies.

Approach speed		Reading distance		Letter height (capitals)	
km/h	mi/h	m	yd	mm	in
80	50	120	130	300	12
80	50	90	97	225	9
50	30	60	65	150	6
30	18	45	49	115	4.5
15	9	30	32	75	3
15	9	23	25	56	2.25
0	0	15	16	38	1.5
0	0	11	12	28	1
0	0	8	8.5	19	0.75



This diagram shows how the speed of traffic along a road can be used to determine the scale of variation along the edge, the duration of views and the size of openings.

Figure 9.4.3 iv - Examples of roadside landscape design for signage at the entrance area. (BELL, Simon, 1997, p28-29)

Human perception-brake reaction time is an important aspect of entrance design. This is an intensely studied area in transportation, in a variety of settings, using a variety of methods. Green⁹ presents an analysis of a large number of data sets in order to try and clarify 'how long does it take to stop?'. He identifies the most important variable in brake response actions as 'expectation'. He decomposes the definition of 'driver expectancy', within which 'spatial certainty' (knowing where) and 'temporal certainty' (knowing when) are integral.

In his final conclusion, Green concedes that because of the site specific conditions of each situation, no single study can reproduce the full complexity of human behaviour and its sensitivity to environmental variables, and therefore there can be no single predictive mathematical formalism to capture 'reaction time' to environmental cues.

The use of comparative analysis

A comparative analysis of entrance arrival scenario-types were analysed using a matrix. This is a tool adopted in business planning for comparing against two dimensions. Such matrices provide a simple framework for clarifying decisions according the future potential of, for example, individual [business] decisions. This became useful in the wayfinding study for exploring the importance of knowing 'when' and 'where' in the

⁹ GREEN, Marc, "How long does it take to stop? Methodological analysis of driver perception-brake times", Transportation Human Factors, 2(3), 2000, pp195-216

‘finding entrance’ decision process and in the process of distinguishing a ‘good’ entrance from a ‘bad’ entrance (see figure 9.4.3.v below) and each type of scenario provided a description that could be used to summarise one or more of the sites’ entrance arrival experiences, when arriving in the most often used direction of travel, eg ‘arriving at <Afan Argoed> from <the south>’.

From conducting the matrix analysis, it appeared that in order to gain entrance reassurance and to have time to react surely and safely, there are a number of decision processes and tasks subsumed within ‘time to react’ to entrance cues:

1. time to make the decision whether or not to turn
2. time to perceive where the entrance is, and read the sign, and
3. time to turn off safely.

Figure 9.3.4.v – Matrix analysis

		Do I know where the forest entrance is located?	
		no	Yes
Do I know when to expect to see the forest entrance?	yes	<p>a) Even though visitor knows <u>when</u> to expect entrance (i.e. advance warning is good), visitors may have difficulty knowing <u>where</u> the entrance is located.</p> <p>Therefore they may not have time to react and turn off <u>safely</u></p> <p>e.g. Queen Elizabeth Forest Park (from Phase I) arrival from north</p>	<p>b) Visitor knows <u>where</u> the entrance is located (i.e. clear view of entrance) <u>and when</u> to expect it.</p> <p>Therefore visitor has time to:</p> <ul style="list-style-type: none"> - read the sign - expect the entrance - see the entrance - react and <u>turn off safely</u> <p>e.g. Cannock/ Hafren/ Coed y Brenin</p> <p><u>Best possible scenario</u></p>
	no	<p>c) The visitor does <u>not</u> know either <u>where</u> to expect the entrance (no clear view) or <u>when</u> to expect (no <u>advance</u> warning).</p> <p>Therefore the visitor will <u>not</u> have time to react in safety, or may drive past the entrance altogether</p> <p>e.g. Afan Argoed from south</p> <p><u>Worst possible scenario</u></p>	<p>d) Even though the visitor knows <u>where</u> the entrance is located (clear view); they may not know <u>when</u> to expect it (no advance warning).</p> <p>However, providing the visitor has <u>time to react in safety</u>, this need not be a problem.</p> <p>e.g. Pages Wood</p>

The two key user needs can be defined as follows:

a) when to expect ('time to expect')

the best sites were those which provided the driver with plenty of advance warning and where visitors were able to see the actual entrance, together with a reassurance sign. Good visual warning gives the driver 'time to expect'; and therefore extends the 'decision space' within which the user has to decide whether or not this is the right site.

b) where the entrance is ('time to react' to entrance cues).

This relates to having a clear view of the entrance: it was found that the best sites indicated advance warning of the site in combination with a clear view of the entrance. It did not seem to be important whether the distance to the entrance was indicated or not on the advance warning, since visitors did not appear to notice the entrance signs, until they could see the entrance itself. The key criterion for assessing the safety/usability of the site entrance, is visual reassurance. This affects all users – whether they are actively seeking the site or are 'just passing by' - because it affects their ability to *find* entrance and turn in *safety*. Site safety/usability may also affect the decision whether to visit at all.

A tool in the making

Two models of 'good' and 'bad' entrance (Coed y Brenin in the first instance, and Afan in the second) were used to plot the point at which both entrance/sign came into view and a triangle of vision drawn between sign and entrance. The more obtuse the angle the shorter the space/time frame the user is provided with in order to react (figure 9.4.3.vi) whilst the longer the view in the road ahead of the entrance/sign arrangement, the more acute the angle of vision is. However these points of vision can only be plotted by role-playing the driving experience in order to know where the entrance/sign arrangement comes into view at a given speed of travel, within a given landscape setting where lines of visibility cannot be mathematically predicted. These are shown below, illustrated in terms of 'typologies of use' which can be described *visually* and *verbally* (in words).

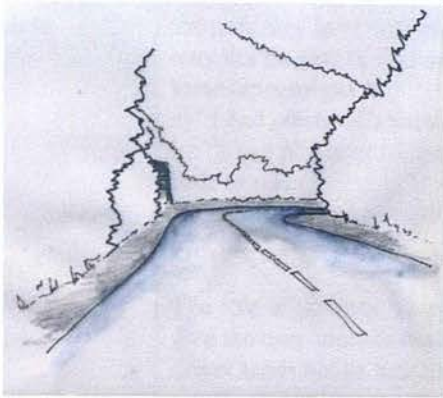
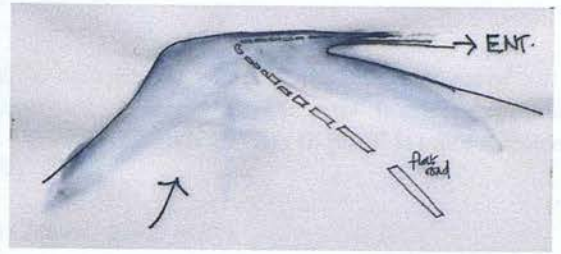
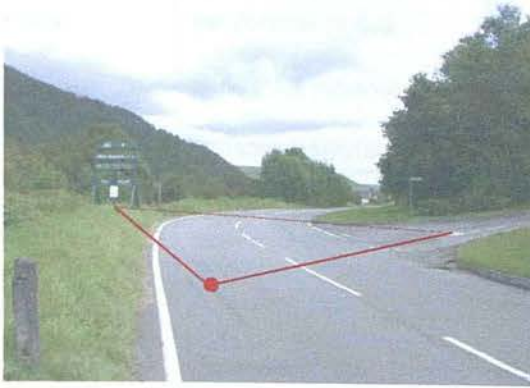


Figure 9.4.3.vi - An entrance 'typology of use' (Afan Argoed):

"I had no advance warning, and had no time to react when I saw the entrance (I missed the entrance and had to brake suddenly/drive on until there was a place to turn around)."

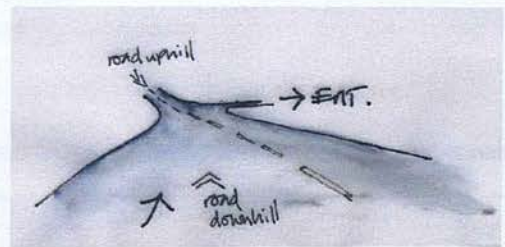


Figure 9.4.3.vii- An entrance 'typology of use' (Coed-y-Brenin):

"I had plenty of advance warning and did have time to react when I saw the entrance".

The main issues became summarised in the report as follows:

LEVEL III –	Site Entrance
The decision:	the decision to find
Key task:	finding the entrance
Key issue:	entrance reassurance
Theoretical Background:	<p>‘Time to react’: No singular mathematical formulism can capture the subtle effects of environmental variables. The most important variable in ‘time to react’ is driver expectation. ‘Expectancy’ improves reaction time. Intuitive analysis of ‘time to react’ is more effective than using charts/tables. (Green, 2000)</p> <p>Reassurance signs reinforce decisions (Passini, 1992, p106)</p>
Key problem:	<p>the user may have no problem in finding the approach route to the entrance, but the entrance may not be easy to find and/or easy to use. The users’ experiences usually fell into one of three categories:</p> <p>a) “I had plenty of advance warning and time to react when I saw the entrance”</p> <p>b): “I had plenty of advance warning but the entrance came up suddenly and I did not have time to react.”</p> <p>c): ”I had no advance warning but had time to react when I saw the entrance”</p> <p>d): “I had no advance warning and went straight past turned around and came back”.</p> <p>The role of advance warning: advance warning signs in combination with sight of the entrance give the user ‘time to react’. Additional role – in prompting <i>impromptu</i> visits to the site. The driver tends not to turn until a sign “entrance”, the site name and perhaps key activity are clearly visible.</p>
Key user need/s:	there needs to be good visual reassurance of when to expect to see the entrance (advance warning signs), and where it is physically located. Signs that are placed to create a long triangle of vision between the driver’s sight line and the entrance itself are ‘good’ entrances. Entrances can be made more ‘entrance-like’ by opening up with wide verges.
Key criterion: sub-criteria:	<p>VISUAL REASSURANCE (ENTRANCE)</p> <p>visual accessibility; visual clarity; simplicity; consistency</p>
Methodology:	Compare different approaches to and experience of the entrance experience.
Development of Assessment Tool	Assessment of entrance signs and layout by on-site evaluation and visitor questionnaire.

Tool no. 3: ‘line and dot method’- ENTRANCE LAYOUT

This tool (plate 9.4.3/Tool no.3) assesses entrance usability and safety. It is a three step process, analysing visual accessibility to the entrance and entrance signage on arrival at site.

This tool helps Forest Managers identify:

- whether the driver has advance warning of the entrance (entrance expectancy);
- whether the driver has time to react to the entrance and turn in safely;
- goodness of fit between sign position and the driver’s view from the road’ (whether the signs are visually accessible and clear).

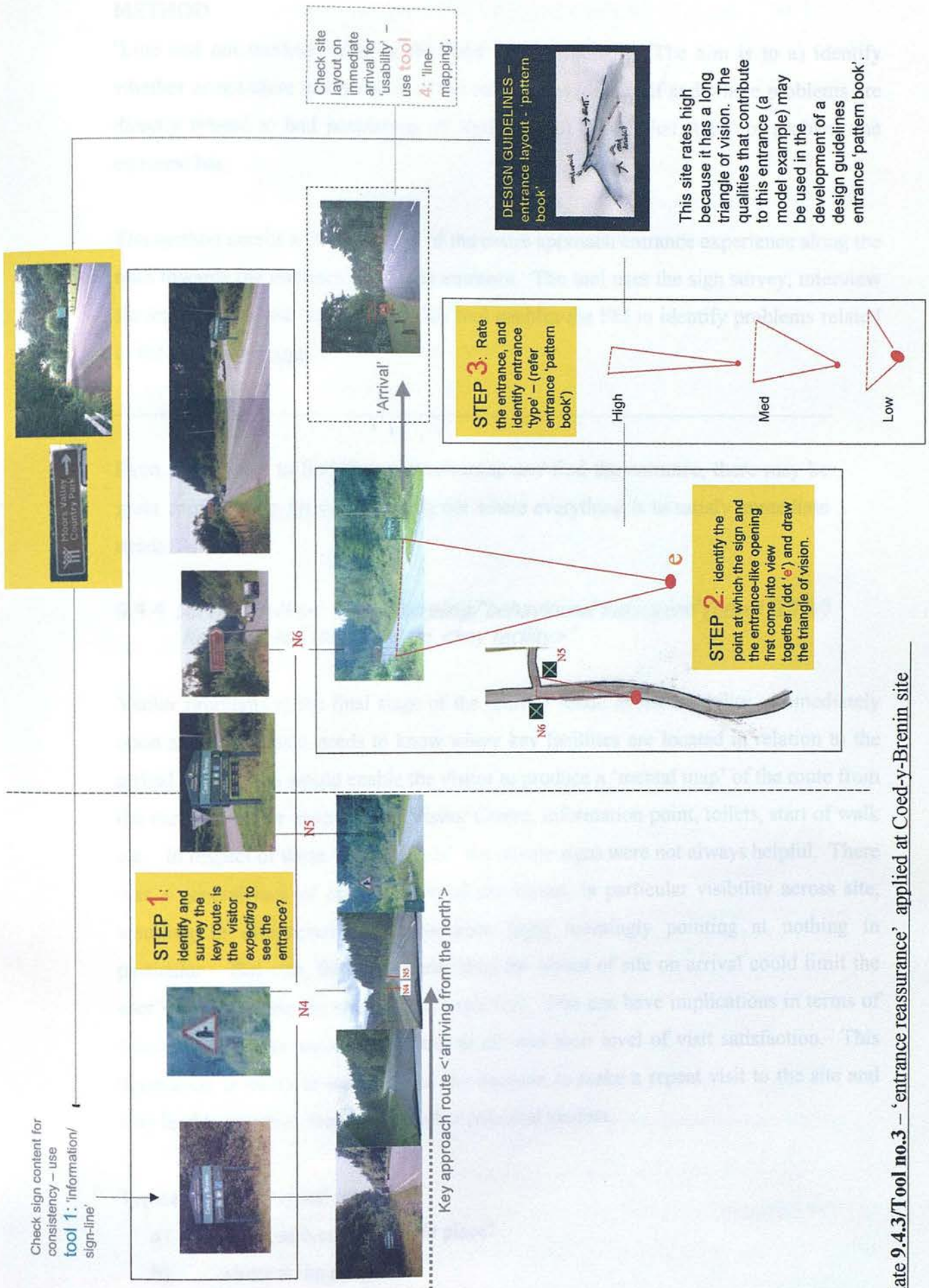


Plate 9.4.3/Tool no.3 – 'entrance reassurance' applied at Coed-y-Brenin site

METHOD

'Line and dot method' is an 'in the field' survey method. The aim is to a) identify whether or not there is a problem at the entrance b) identify if and where problems are directly related to bad positioning of signs, and c) if so, what 'type' of problem the entrance has.

The method entails a 'break-down' of the entire approach/entrance experience along the road towards the entrance and at the entrance. The tool uses the sign survey, interview survey findings, and 'role play'. This tool enables the FM to identify problems related to the entrance layout.

Even if it is easy to find the approach route *and* find the entrance, there may be great confusion on arrival in finding out where everything is to satisfy immediate needs.

9.4.4 Survey method: **site mapping**/'behavioural indicators' (Level III/IV) *Key user-led task: 'finding <key facility>'*

Visitor problems at the final stage of the journey relate to site legibility. Immediately upon arrival, the user needs to know *where* key facilities are located in relation to the arrival point. This would enable the visitor to produce a 'mental map' of the route from the car park to, for example, the Visitor Centre, information point, toilets, start of walk etc. In respect of these 'arrival needs', the on-site signs were not always helpful. There was a general lack of consideration of site layout, in particular visibility across site, resulting in directional and reassurance signs seemingly pointing at nothing in particular. But also, failure to understand the layout of site on arrival could limit the user's ability to use the site (i.e. site usability). This can have implications in terms of whether the visitor uses the facilities at all, and their level of visit satisfaction. This impression is likely to impact upon the decision to make a repeat visit to the site and may lead to negative feed-back to other potential visitors.

Typical problem 'types' related to:

- a) have I arrived at the *right* place?
- b) where is the car park?
- c) where do I pay/do I have to pay?

- d) where is the visitor centre/key information point?
- e) where are the toilets/are there any toilets?
- f) where does the key activity start? (e.g. mining museum, start of the trails, café or picnic area).

There were a variety of different problems, all related to a general lack of fit between sign placement, sign content, and site layout. These problem ‘types’ were identified with the help of visitor interviews, but behavioural observation and role-play became particularly useful at this level of the journey.

LEVEL IV	Arrival and site experience
The Decision	the decision to find
Key wayfinding task:	finding key facilities on arrival
Theoretical background:	<p>sign location/sign content and spatial configuration:</p> <p>Spatial configuration (or site layout) generates the wayfinding problems but also it acts as a ‘wayfinding support system’: it contains the information to solve the problem (Passini, 1992, p110) e.g. ‘where are the toilets’, ‘where is the VC’, ‘where do the walks start’.</p>
Key issue:	site legibility
Key problem:	it may be easy to find the approach route <i>and</i> find the entrance, but there may be great confusion on arrival in finding out where everything is to satisfy immediate needs.
Key user needs:	<p>On immediate arrival the user needs:</p> <ul style="list-style-type: none"> a) signage reassurance of having arrived at the right place b) to see immediately where key facilities are located on site, so that the user can plan a walking route from the car park: thus, ‘where to park’, ‘where to pay’, ‘where is the Visitor Centre’, ‘where are the toilets’, ‘where are the walls/other key activity’ are intrinsically related. <p>These buildings/object/things must either be obvious because they appear self-evident (e.g. toilet-like building, or a ‘gateway to the walks) or there is an easy to understand location map; on site, a directional sign alone is not very reassuring because the user needs a ‘mental map’ of where to go to know how far he/she has to walk. This is particularly important for people with disabilities and their helpers.</p>
Key criterion: sub-criteria:	<p>LEGIBILITY (SITE LAYOUT)</p> <p>visual accessibility; visual clarity; simplicity; consistency</p>
Development of Assessment tools:	Mapping of typical behavioural needs of users in relation to key facilities on site.

Key visitor behaviours could be used as indicative measures (‘typical behaviours’) of site usability problems. The conceptualised tool - a ‘line-mapping’ approach – was suggested for use in combination with specific questions in the visitor survey to identify

the individual key problem areas. This tool adopts an approach which takes its inspiration from the space syntax colour coding method - used indicate lines of visibility in this instance. Specifically, see (plate 9.4.4/Tool no.4) these are 'lines of natural mapping' eg a blue line indicates the point at which a scenario of use begins in the car park, searching for the toilet block; the point at which the user 'receives' sight of an obvious looking toilet block, the line of vision becomes red. If there is partial reassurance of heading in the right direction, through the use of a sign, the line is yellow. The general hypothesis is that good site 'legibility of use' allows the user to make easy 'natural mappings' between the location, and function, of all the site's key facilities on immediate arrival. (The analysis which 'grounds' this theory in site based observations identifies a variety of 'typical behaviours'. It was suggested that these could be incorporated into forest site design guidelines to indicate a possible problem. It has not been possible to present these here, but the example given illustrates a group of elderly users' exhibiting overt indications of 'uncertainty' over where the toilets are by walking back and forth over the same spot, deliberating over a toilet sign and looking around and about rather anxiously).

Tool no. 4: 'line-mapping' -SITE LEGIBILITY

This tool (see plate 9.4.4/Tool no.4) assesses site usability. It analyses visual accessibility to the key facilities, and/or information helping the users to located these. It also assesses the effectiveness of directional and reassurance signage around the site on immediate arrival.

This tool helps forest managers identify:

- goodness of fit between siting of signs, the site layout and the user's immediate arrival needs;
- goodness of fit between the pedestrian's view lines when walking around the arrival area at/from the car park, the siting of signs and the site layout;
- the effectiveness of directional and reassurance signs around the arrival area. see

METHOD

'Line mapping' is an 'in the field' site survey method. The aim is to a) pinpoint problem spots around the arrival areas and b) identify if the problem relates to a lack of signage - directional and/or reassurance signage - or signage surplus; or c) whether problems are directly related to lack of sign visibility- whether it is sign clutter, tree growth, or bad positioning.



Car park



Key problem situation: 'finding the toilets from the upper car park'



Toilet block



DESIGN GUIDELINES
- Site layout - 'typical problem situations'

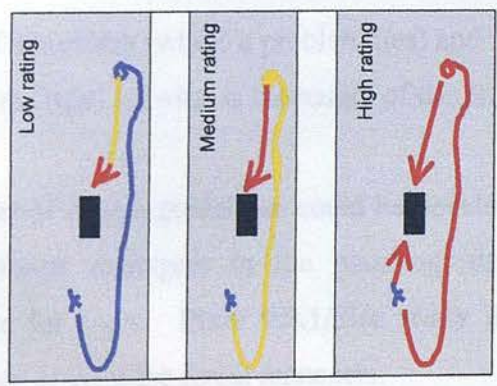
STEP 4: Rate the site for legibility, identify problem and seek appropriate solution type (refer 'site guide')

DESIGN GUIDELINES
- Site layout - 'typical behaviours'

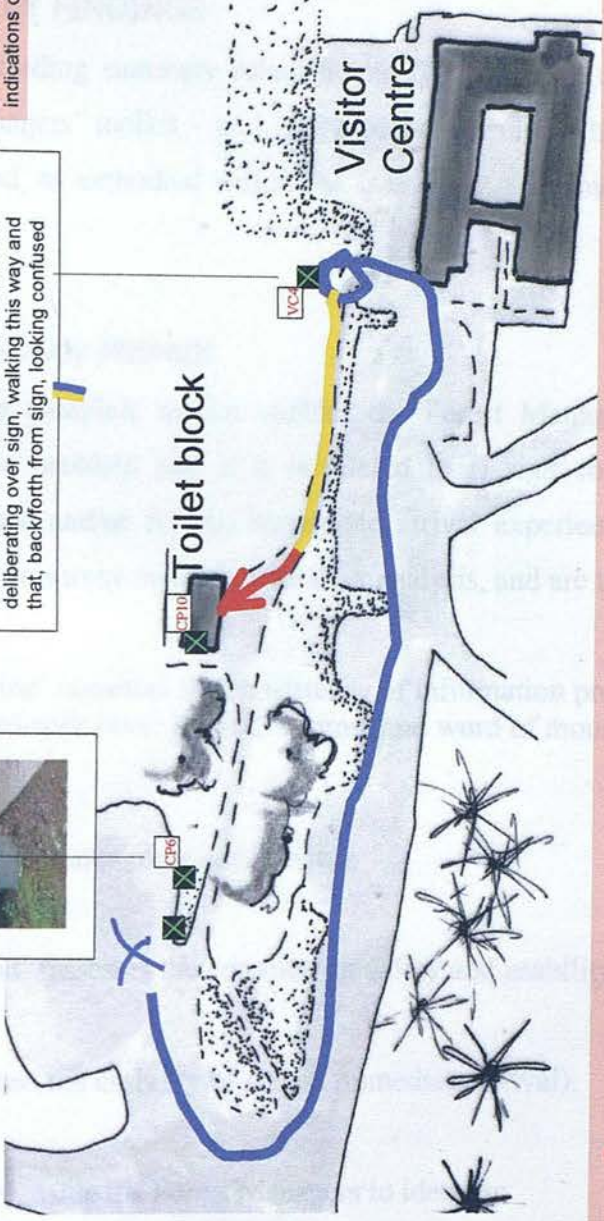
STEP 1: identify key problem 'arrival' areas:
Use level IV 'key question' in visitor survey to identify problems on arrival by 'key task' eg 'finding toilets', and/or observe people for behavioural indications of problems.



'uncertainty' in user behaviour: visitors are deliberating over sign, walking this way and that, back/forth from sign, looking confused



KEY:
Blue = no visual reassurance;
Yellow = partial reassurance;
Red = full visual reassurance.



STEP 2: identify key arrival point and role play typical behaviour pattern noting at what point user receives reassurance from signs, and then at what point visual reassurance is gained by getting sight of the toilet block itself.

STEP 3: 'line-map' the first time user approach route to the toilets, by foot, from a key point in the car park: mark the starting point with a blue cross, continuing with a blue line until the user receives partial reassurance from a directional sign - at this point the line becomes yellow; then the point at which the user receives 'full' reassurance by getting sight of the object/thing (ie toilet block), the line turns red. At a good site there will be very little blue and yellow, with mostly red in the line-map.

9.4.4/Tool no.4 - 'Arrival legibility' applied at Coedy-Brenin site, when assessing the usability of the site for 'finding the toilets'.

At this site, it should not have been necessary for users to have take so long to find out where such a key facility is located, particularly when, in this instance, users could easily access the toilets from the car park, without having to walk all the way around via the Visitor Centre, were it made clear that it is possible to do so in the first instance (where sign CP6 is located); design solutions might involve a combination of clearing the trees to open a view towards the toilet block, and/or adding a large clear toilet symbol or the words 'toilets' to the existing sign 'CP9'.

The method entails a ‘break-down’ of the arrival area, ‘task by task’. The tool analyses ‘key arrival tasks’ using the sign survey, interview survey findings, and ‘role play’. Following a four step procedure this tool enables the forest manager to identify problems related to site legibility.

9.5 SUMMARY OF KEY FINDINGS

Key findings of the wayfinding summary relate in the first instance to the research outcome – the forest managers’ toolkit – and in the second instance the utility of the general site survey method, as embodied within the overall research methodology for the wayfinding study.

9.5.1 Four Site Survey Methods

Using the four tools, the complete toolkit enables the Forest Manager to identify whether or not there is a problem and if it is related to i) sign content, ii) sign placement, iii) the entrance and/or iv) the immediate arrival experience. The four individual tools combine site survey methods with desk analysis, and are termed:

- i ‘information/sign-line’ (assesses the consistency of information provision in sign content as compared with other printed, internet and word of mouth information in circulation);
- ii ‘decision-tracking’ (assesses route connectivity);
- iii ‘line and dot method’ (assesses the entrance for safety and usability);
- iv ‘line mapping’ (assess the usability of site on immediate arrival).

These tools are designed to enable the Forest Managers to identify:

- the existence of a problem (where a problem lies) and
- what the problem ‘type’ is (what is the nature of the problem).

It is envisaged that a set of design guidelines could be developed that would fit within the toolkit, to help forest managers in the planning, design, assessment and/or monitoring of the sites for signs. **Plate 9.5.1/Site study diagram** summarises key aspects of the assessment process for forest managers:

SITE STUDY DIAGRAM

VISITOR SURVEY

Questionnaire – wayfinding scale

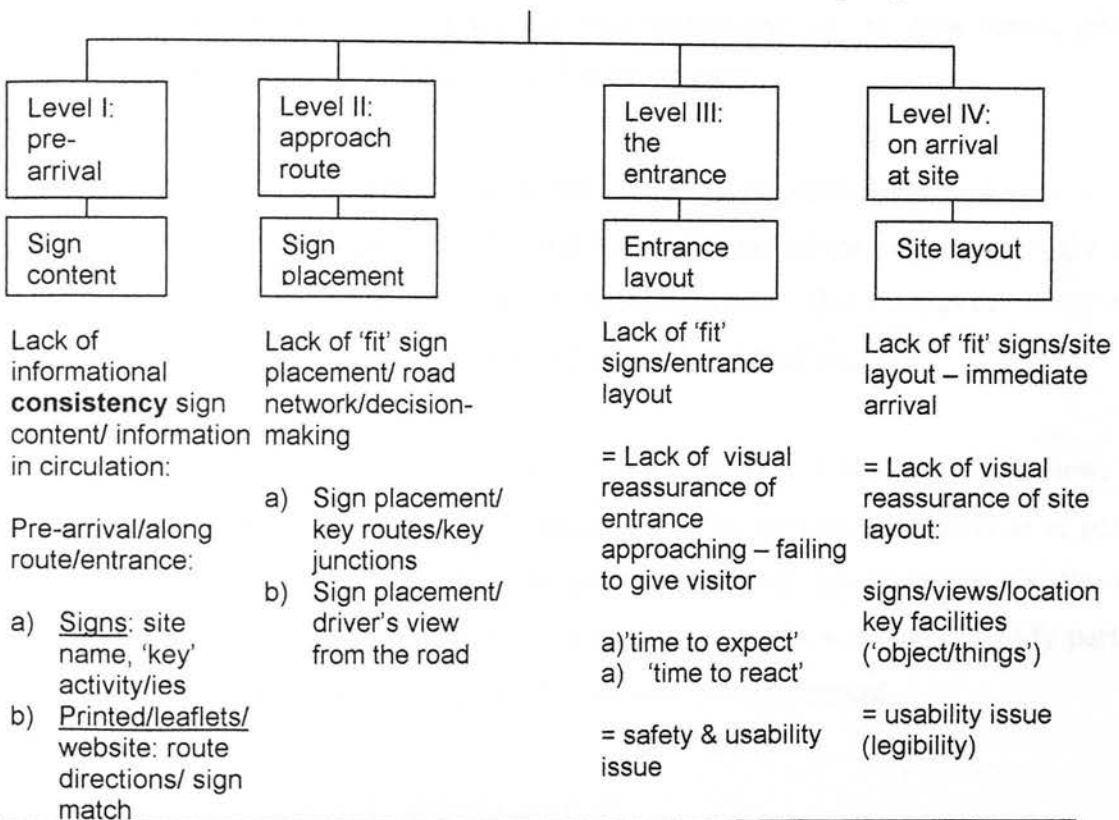
ENVIRONMENTAL SURVEY

Sign audit + Route survey
- visual analysis

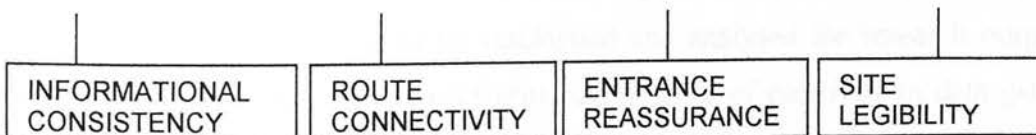
SCREEN FOR POTENTIAL PROBLEM AREAS – VISITOR QUESTIONNAIRE:
(‘where’ are the problems – what key issues?)

Key issues arising – (analysis)

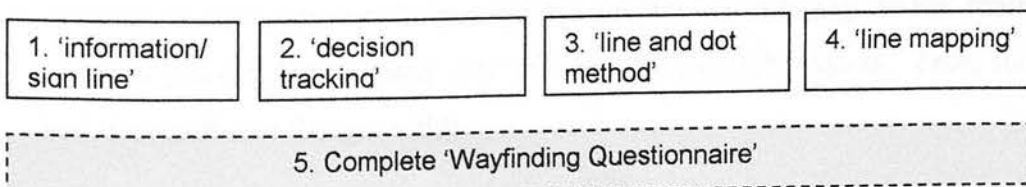
Four main ‘problem’ categories - ‘the wayfinding sequence’ model



Four KEY CRITERIA



FOUR site survey methods + ONE visitor survey approach = 5 TOOLS:

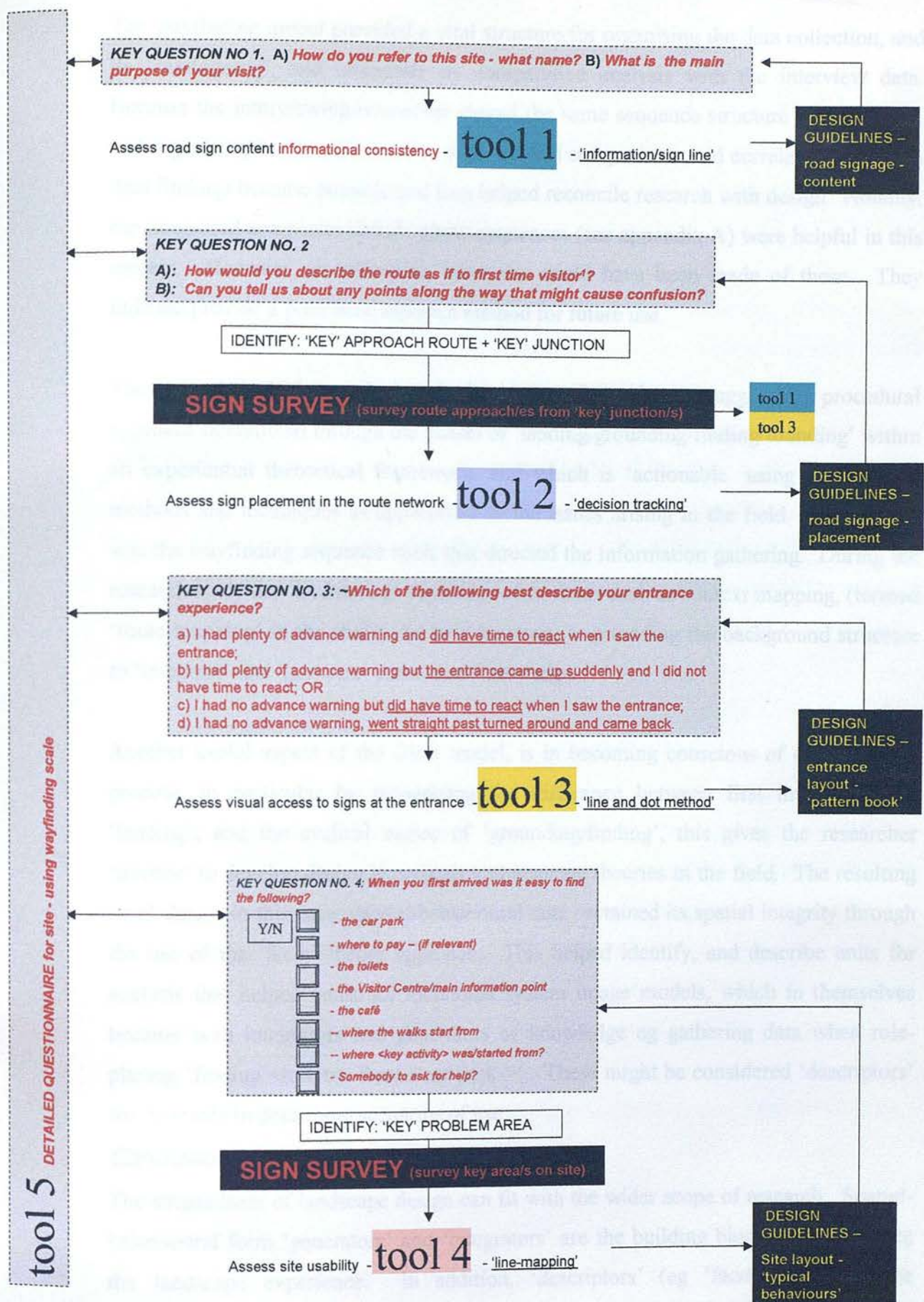


- i) Sign content should be assessed in the context of the whole 'information system': there should be consistency in provision of information from pre-arrival through to entrance *AND* consistency in content and style of wording, colours, and symbols used;
- ii) Signage should be assessed at the key junction point/s where the regional/national feeder route connects with the local route in the *key* direction of travel. However, IF the manager wants to keep a place local key junctions on the local network only should be assessed.
- iii) Visual accessibility to the entrance should be assessed with both safety and usability in mind. Good entrance reassurance in the view ahead, gives the driver both 'time to expect' and 'time to react'.
- iv) The legibility of a site on arrival should be assessed. Visual access to all key facilities e.g. car park, VC and toilets on immediate arrival, gives the visitor good reassurance of where everything is located. This enables the visitor to find his/her way about easily, and to get the most out of the visit.

An overview of the complete toolkit is shown in plate **Plate 9.5.1/Overview**. This illustrates how the four site survey methods may be used autonomously or as part of a complete package, showing how the first stage in site assessment is for the Forest Manager to 'filter' potential problem areas for assessment, to then identify particular problem categories and select an appropriate tool for assessment.

9.5.2 A 'research-into –design' process

The difficulty in gathering and processing data for generating design theories, is that whereas normally 'design' data - ie, visual-spatial analysis – is 'grounded' in a design project, in research it must be catalogued and analysed for research purposes. The challenge is to retain design integrity and a sense of creativity in data gathering and processing during the site survey, whilst at the same produce a meaningful research outcome. Application of the knowledge integrators and generators eg 'threshold' and 'theoretical comparisons' helped in this respect, introducing design thinking to the research process, but in a way that informed the research process. Thus, such methods had 'research-into-design' utility.



¹this question may be adjusted, as appropriate, to ask 'as if to first time tourist' or 'as if to first time local visitor' - depending on whether site is intended to be a local/community facility, or a tourist destination site

Plate 9.5/Overview : Overview of 'Wayfinding Toolkit' for site managers.

The wayfinding model provided a vital structure for organising the data collection, and its 'cataloguing', and ultimately its comparative analysis with the interview data. Because the interviewing-researcher shared the same sequence structure for gathering, and organising its data, (ie the four stage model) comparisons and correlations between data findings became possible and thus helped reconcile research with design. Notably, the integrated/composite sketch/ photo sequences (see appendix A) were helpful in this respect. However, on reflection, more use could have been made of these. They indicate provide a promising research method for future use.

The general method described at the beginning of the chapter suggested a procedural approach operational through the phases of 'landing/grounding/finding/founding' within an experiential theoretical framework, and which is 'actionable' using a variety of methods and techniques as appropriate to the issues arising in the field. However, it was the wayfinding sequence itself that directed the information gathering. During the research study the 'facilitating' capability of methods such as context mapping, (termed 'route mapping' in the study) did help however, in providing the background structure to 'integrate' and 'generate' contextual knowledge.

Another useful aspect of the Girot model, is in becoming conscious of own's design process, in particular by recognising the difference between first impressions at 'landing', and the cyclical nature of 'grounding/finding', this gives the researcher 'licence' to develop design hypothesis and generate theories in the field. The resulting 'test' data – in this case, *spatial*-behavioural data –retained its spatial integrity through the use of the 'facet' theory approach. This helped identify, and describe units for analysis that helped construct individual system image models, which in themselves became both integrators and generators of knowledge eg gathering data when role-playing 'finding <toilets> from <car park >'. These might be considered 'descriptors' for their role in describing scenarios of use.

Conclusion

The situatedness of landscape design can fit with the wider scope of research. Spatial-behavioural form 'generators' and 'integrators' are the building blocks for evaluating the landscape experience. In addition, 'descriptors' (eg 'facets' of landscape experience) and 'facilitators' (eg 'context' and 'route' mapping) provide the means by which integrated spatial-behaviour analysis can be applied for a contextual approach to research.

Chapter 10:

TOWARDS A SHIFT IN THINKING

10.1 INTRODUCTION

This thesis has generated a groundwork body of theory and discussion. Now that the investigation is complete, there arises the question of how the merit of this work should be judged.

This chapter will attempt to establish the significance of the work by placing it within the context of current research and design directions. Firstly, the main contribution to knowledge is established, secondly the relevance of the work to the wider landscape architecture community is discussed, this is followed by an examination of the research approach, and finally useful outcomes, and aspects of the work that require further investigation, are identified.

10.2 RESEARCH CONTRIBUTION

This thesis has provided an interpretation of the behavioural science/design gap problem from a landscape architectural point of view. The investigation identified the different dimensions of 'the problem' at the same time as constructing 'the solution'. The research study was highly exploratory, and presents a groundwork for further development, dissemination and debate. In particular, the rationale it presents for integrated spatial-behaviour analysis merits future investigation to establish its practical relevance to educational and professional landscape practice.

The contribution to knowledge and understanding this thesis presents should be judged in relation to its initial point of departure.

Departure point

In the beginning, this thesis highlighted a link between a lack of acknowledgement of the gap problem, and a lack of social responsiveness, in (landscape) design. The basic premise was that the gap is likely to remain a problem until designers can 'see' its relevance to their design process. It was suggested that this aspect of the problem must

be addressed if the situation is to shift from where it currently sits - locked in the research sphere as *the applicability gap problem*, and in the design sphere as a *non-problem*.

The research could have set out to prove the existence of the stated link between a lack of recognition of the gap by landscape designers, a lack of social responsiveness, and the need to raise consciousness of the utility of behavioural science in design. However, one must ask what useful outcome this could have achieved towards addressing the science/design gap problem other than to reinforce its existence. Furthermore, it was not clear *exactly* what the researcher would have had to prove the existence of. Consequently, in the beginning, the thesis asked, what *is* 'the problem'?

The problem

According to the literature, a problem cannot be dealt with in design until a solution type presents itself. Thus, by reframing 'the problem' in the context of landscape design theory, its different dimensions could be considered from a new perspective. The experiential paradigm presented a framework within which some positive theory building could take place. Behavioural science concepts (as framed by environment behaviour theory) were explicitly linked to spatial form (as conceptualised in landscape design theory), and by exploring the practical application of the theory 'in action' during site survey analysis, the potential utility of the theory, and its methods, to facilitate 'a new kind of knowing', was conceptualised. Thus, by identifying a framework within which to place 'the problem', the experiential paradigm was given shape and form. It was also given a specific landscape identity.

By adopting an interpretive/reflective research approach, the use of 'self' became a key instrument in the process. This makes research validation all the more difficult.

The research

The situatedness of the research and the theoretical development it presents, is a key feature of its contribution. It recognises that:

"Landscape theory is specific, not general...landscape architectural design and theory are based on observation, or that which is known through experience, or the immediate and sensory – that which is known by all the senses, not only visual. Thus landscape architectural theory is situational – it is explicitly

Meyer was quoted for emphasising the need for external linkages with other cultural ideas, whilst at the same time strengthening the position of landscape architecture; she also adopts an historical perspective, whilst offering new directions. This thesis has followed this general critical approach - highlighting the evolution of the current position whilst at the same time offering a set of principles and procedures for integrated spatial-behaviour analysis. In this respect the thesis fits with the type of landscape theory Meyer describes that serves as a ‘mediating’ device, or an ‘activity’, for constructing new theory through design. This positive theory building approach had been highlighted by Lang and others as being the most useful approach to addressing the behavioural science/design gap, and of particular benefit to the internal development of a discipline.

In emphasising the role of ‘evaluation-in-action’ for addressing the science/design gap from ‘from within’ one’s own design process, and through the reflective/interpretive approach adopted by the research itself, the thesis has gone some way to making explicit the landscape design process, emphasising aspects of which can be applied as a ‘method’ for user needs assessment purposes. The importance of evaluation should be emphasised since accountability is an increasing concern and clients are ever conscious of costs associated with, for example, expensive signage systems.

It is notable that an emerging theme in the research sphere is the need for context specific evaluation models for real world research². Patton, a key writer on evaluation methods emphasizes that good evaluations will seldom be guided by, and directly built on evaluation models but rather, each evaluation setting is approached as a problem in itself which needs resolving. In the context of the current discussion which highlights the lack of critical evaluative frameworks for design, this raises a key issue: since each landscape project is situation specific in every way - physically, politically, culturally, and so on, and in addition, since each individual designer sets about the project with certain intentions in mind – generic evaluative frameworks are unlikely to apply. One must therefore question the value of any attempt to formulate such frameworks and of any claim to their potential effectiveness in a design critique as a fixed ‘test’ of good

¹ MEYER, Elizabeth in: SWAFFIELD, S, 20002, p 2

² PATTON, M, Q, ‘Creative Evaluations’ (1981) and ‘Practical Evaluations’ (1982) in ROBSON, Colin, *Real World Research – A Resource for Social Scientists and Practitioner-Researchers*. Blackwell Publishers Ltd, Oxford, UK, 1993

design. This thesis does however claim to lay the foundations of thinking for conceptualising a flexible, generalised methodology that can examine individual projects, or situations, *in context*.

The implication of the research is that with the right tools - in particular those for 'evaluation-in-action' - the designer should be able to generate a set of situation-specific criteria in a kind of 'self-assessment' method: this type of approach was demonstrated in the research investigation where theories were 'grounded' in field observations in the forest wayfinding study to test and re-test design hypotheses. Here, design hypotheses developed into small-scale research studies of their own, testing the validity of an identified criteria within a given context of use, a process which was enabled through the use of knowledge integration and generation tools, and associated 'facilitators' and 'descriptors' which collectively structured the process.

The type of method appropriate for constructing evaluations in landscape design must entail the extraction of one's own design process, in order to explain the design outcome: one needs a method in order to explain what has been carried out, to analyse the 'results' and to draw 'conclusions'. However, a lack of 'method' is endemic in the design world:

"Designers develop a preference for a particular way of structuring their process of design and hold strong attitudes about appropriate procedure. Some prefer to make decisions along the way, moving deliberately from one step to the next, while others engage in a free-flowing inquiry in which nothing is frozen until all aspects seem right. These personal styles help shield them from the anxieties of the open search. But since the design process should fit the problem as well as the designer, a personal style is also a limitation of possibilities, a latent distortion of the problem."³

This research study has attempted to establish the means by which objectivity can be instilled in the design process using a non-systematic approach, and yet one which acknowledges the role of 'the method'. In the process, the research has addressed two major themes in landscape architecture: a general need for improved methods for assessing user needs on the one hand, and the need for better tools for transparent decision-making about landscape change, on the other. These two needs, alongside others, are highlighted in the current British Landscape Institute's Research Manifesto, which should be referred to at this point in attempting to place the current thesis in context of the wider research remit of landscape architecture.

³ LYNCH, Kevin & HACK, Gary, Site Planning (1984) in: SWAFFIELD, S, (Ed) *Theory in Landscape Architecture. A Reader*. University of Pennsylvania Press, USA, 2002, p 58

The Landscape Institute's Research Manifesto was updated in September 2001⁴ to take into account a number of significant developments including: 'demands for more inclusive access to the outdoor environment, to ensure social equity'; 'a renewed interest in urban design and regeneration, in the creation of high quality, healthy urban environments'; and 'changing patterns of countryside access and rural land use'.⁵ In a section on 'Addressing Society's Needs from the Profession, including Education', the importance of taking best advantage of 'the unique skills and expertise of landscape architects, both now and in the future', is emphasized.

In light of this Research Manifesto, and new (British) legislation such as the recent Urban Design Guidelines and the Disability Discrimination Act (which comes fully into force in 2004), it is in the interests of society that landscape practitioners make more and better use of environment-behaviour theory and its methods, and a broadened portfolio of expertise can only improve prospects for the profession at large as well as individual design practices. However, the challenge is to incorporate 'outside' expertise to the enhancement of 'the unique skills and expertise of landscape architects': this comprises a skill base which can provide a visual-spatial interpretation of the landscape as an open space setting for human activity, and can envisage change (over time).

Current thinking in landscape architecture, as revealed in the writings of Christophe Girod, James Corner and other contemporary thinkers, would suggest the emergence of a phase which is moving towards a less deterministic, more humanistic approach to design. However, environment-behaviour researchers have to date made limited impact in shifting mainstream design thinking away from the established approach to design which retains a focus on visual-spatial form. This approach has been blamed by Sancar, Cooper-Marcus and Francis and other environment-behaviour researchers, as leading to the reproduction of previously used 'solutions' or to 'artistic statements' that do little to address the current needs of a given public. However, such arguments are not intended to present a case for using the behavioural approach in place of the visual approach, but rather to reconcile the two.

⁴ LANDSCAPE INSTITUTE, *The, Research Manifesto*, (Professor Catherine Ward-Thompson, Chair - Landscape Institute Research Committee), London, September 2001 [<http://www.l-i.org.uk/Research%20Manifesto.pdf>]

⁵ *ibid*

The argument presented by this thesis, (which mirrors others' in the environmental-design research sphere), states that an approach which uses human behaviour or social



Figure 10.2.i – North Wacker Drive, Chicago: an image selected by the author of an article to illustrate “a place that invites people to saunter around and linger.” (ANDERSON, Thorbjörn, “What can we learn from American classics?”, *Topos* no 45, Dec 2003, p26)

activities to *inform* and shape the designed environment, would introduce an evaluative approach to landscape design. However, the explicit use of ‘form-images’ of empty, pristine places continue to provide a source of design reference and inspiration, thus reinforcing an environmental ‘bias’ in which *physical* attributes are emphasised over others (figure 10.2.i).

As the leading European journal for progressive design in landscape architecture, *Topos* has an important role to play in the communication of current ideas and thinking. This thesis suggested earlier that it provides an under-utilised ‘feedback mechanism’ which has the potential to highlight if and where designs fail to adequately address the needs of users, and why. Thus the problem is not so much a case of whether or not people appear in images, but rather it is related to the absence of meaningful, evaluative critique. Particularly in the case of far away cultures, (see figure 10.2.ii), how do we know if the response is adequate, or not?

The general lack of robust critical frameworks impacts on the design community because, in its place, the use of *informal Criticism* in progressive design journals circulates ideas, mixing together conjectural and well-informed arguments, resulting in the continual presentation of designs that send out conflicting messages about what constitutes ‘good’ design. The problem, highlighted by



Figure 10.2.ii –One of the many new parks emerging from China’s current green space construction boom. (XIAOMING, Liu, “China’s new urban landscapes”, *TOPOS* no 45, Dec 2003, p 70)

Sancar/Studer⁶, is that the professional activity of Criticism (as is generally conducted by academics) operates autonomously to the social (informal) activity of Criticism, and as a result, theory is perpetuated through diffusion rather than innovation, and the activity of Criticism has not provided the self-consciousness in design that it was expected to add.

The lack of communication and understanding between research and design spheres is a key causative factor of the general lack of self-consciousness in design. It is essentially a 'structural' problem⁷ that is perpetuated by a lack of common vocabulary between research and design. It does not help that there is no overall consensus about how to conceptualise the doing of research⁸, and in particular the nature of what a PhD in design-research should entail⁹. Although there is a recent interest in the development of methodologies for contextualised research, the field has traditionally favoured the use of conventional methodologies that have been developed using the 'scientific' approach.

New directions

Jay Appleton was quoted earlier for emphasising the need to generate debate as an initial step towards generating theory as being more important than gaining 'statistically acceptable proof'. Appleton also highlighted the importance of theory building whilst retaining a view to its practical usefulness. Thus, this thesis should be considered as a groundwork body of theory and discussion for future dissemination purposes. Such dissemination could take into account additional topical and influential factors that this thesis has not been able to take due consideration of, notably, the imminent enforcement of the Disability Discrimination Act (in Britain).

Since the Disability Discrimination legislation was first passed in 1995, new agencies which provide training, guidance and advice on auditing and planning existing and new buildings and outdoor spaces, have emerged. For example, in the sphere of outdoor recreation, 'Fieldfare Trust' provides training and guidance on the implementation of audits, and advice on path and site planning in the countryside setting. They provide training for practical auditing skills, and produce physical access standards for

⁶ SANCAR, Fahriye Hazer, "Behavioural knowledge integration in the design studio: an experimental evaluation of three strategies", *Design Studies*, Vol 17, Issue 2, April 1996

⁷ *ibid*

⁸ ROBSON, Colin, *Real World Research – A Resource for Social Scientists and Practitioner-Researchers*. Blackwell Publishers Ltd, Oxford, UK, 1993

⁹ CROSS, Nigel, [Editorial]

producing check-lists for audits. If designers are to become more frequently engaged with such specialists, or even become key developers of, models, tools and techniques for user needs assessment purposes themselves, then a shift in 'services provided', (perhaps, for example, in-house environmental auditing for assessing physical access), might be imminent. However, a shift in thinking whereby landscape architects are genuinely designing *with the user in mind*, is unlikely to be achieved through legislation enforcement alone. The problem is, reliance on the visual approach to *inform* and shape the designed environment is deeply embedded in design thinking. Although the knowledge base exists for an alternative frame of reference - namely, that which the spatial/behavioural approach offers, as embodied in the experiential paradigm - its everyday application requires a whole new way of thinking entailing the need to view the world through a new lens. The problem is, as stated by Edward Hall, "... we are less aware of actively seeing than we are of talking. No one thinks he has to learn how to 'see'." ¹⁰ In addition, as highlighted by Shön, there is the added problem of the growing perception that researchers who are supposed to feed the professional schools with useful knowledge, "have less and less to say that practitioners find useful."¹¹

The set of principles and procedures outlined by this thesis offers basic concepts, techniques and a type of terminology, which through further development, have the collective potential to provide designers with a useful, and usable, design tool with predictive capability. The utility of behaviour setting theory and behaviour circuitry in spatial analysis is however dependent on generating communication and understanding of the theory. Its application is dependent on the designer's ability to identify and describe discrete spatial-behavioural units of study. In *theory*, the tool offers a way of integrating behavioural knowledge for the purposes of *interpreting* the landscape from the user's point of view, but in a design-like way.

Suggested areas for future work to establish the validity of this research, will now be highlighted.

¹⁰ HALL, Edward, T, The Hidden Dimension. Man's Use of Space in Public and Private. The Bodley Head Ltd, London, 1966, p 64

¹¹ SCHÖN, Donald, A, Educating the reflective practitioner : toward a new design for teaching and learning in the professions. Jossey-Bass, San Francisco, 1987, p 10

10.3 TOWARDS A NEW KIND OF KNOWING

"Confucius defined knowledge as to know that we know what we know and that we do not know what we do not know. Herein lies our predicament: We still do not know that we do not know."¹²

It was suggested in the beginning that the continued existence of the gap problem is not the fault of designers but rather the researchers, who have been asking the wrong questions. It is related to the general lack of communication and understanding between research and design.

Having conducted its investigation, the following conclusions may be drawn as to what future research should address:

- 1) new theory building should take place in the positivist approach, aimed at generating tools for designers to develop their own robust, critical frameworks for design evaluation purposes, where such evaluation takes place 'in action' *within the design process*;
- 2) practical research studies should ask 'what does the designer need in order to know what the users need (in a given context of use)';
- 3) researchers involved in new theory building for landscape architecture must acknowledge the situatedness of the landscape *experience*, and thus recognise that universals do not apply. Notably, the applicability of criteria for 'good design', for example 'sense of choice', is relative to the *context of use* within which it is applied (eg for forest wayfinding purposes choice options are generally unhelpful, whereas in street shopping 'free-will' crossing enhances one's sense of choice and therefore enhances the quality of the time spent in the street). Designers do however need generic models of the landscape experience, (for example of the type provided by the forest wayfinding model), which are highly flexible, organisational structures that can help designers build up 'system images' of individual site specific situations within the general context of use, during their site survey analysis. The spatial-behaviour setting concept provides an appropriate environmental unit for analysis for developing such models. Urban tourism in particular merits development.

¹² BARRY, Anne Marie Seward, Visual Intelligence. Perception, Image and Manipulation in Visual Communication. State University of New York Press, Albany, USA, 1997 p 5

- 4) designers need tools for generating 'system image' models of site specific contexts of use: these might be developed by researchers for application within the design process as *spatial-behavioural* form 'generators' and 'descriptors', together with informational and knowledge 'integrators' and 'facilitators'.

Whilst much of the thinking process in this thesis was situated in reflections which took place in the context of the outdoor activities of wayfinding, exploring and its other variations, and in relation to countryside (forest) recreation, in theory, the principles and procedures for integrated spatial-behaviour analysis, as presented in this thesis, should have universal application. In qualitative research there are established standards of acceptance such as inter-subjectivity, reliability and validity. However, in conducting its theory-building, this investigation has specified the conditions that gave rise to the various problems, issues and phenomena. Consequently, the work should perhaps be judged in relation to its ability to *explain* what consequences occurred as a result of what actions were taken.

The knowledge generated by this research required an approach that was 'design-like'. The most useful methodological aspects of the research approach which help communicate and understand the landscape *as experienced*, will now be summarised for their potential in shifting ways of thinking.

Towards a shift in thinking

The research investigation adopted an approach which in itself provides a potential 'model' for positive theory building. The 'dynamic' version of the Kaplans' model might be used to conceptualise the 'exploration-and-understanding' generated by the thesis itself (see figure 10.3.i). In place of the four boxes which previously read 'coherence/ complexity /mystery /LEGIBILITY', the boxes now represent the main areas in which theoretical exploration took place in this thesis, in the sequence within which it occurred. The numbers in the diagram represent the individual chapters. The dividing line in the diagram represents the two parts of the thesis which explored, firstly a theoretical framework, and secondly a practical enquiry. It is notable that the thesis begins and ends with the gap problem, representing the cyclical/sequential nature of the exploration it has conducted – which in itself is representative of the design process – by which approach the research has brought the gap problem into focus.

The diagram might be considered a ‘dynamic map’ of the research process and provides a critical framework for analysis of the gap problem:

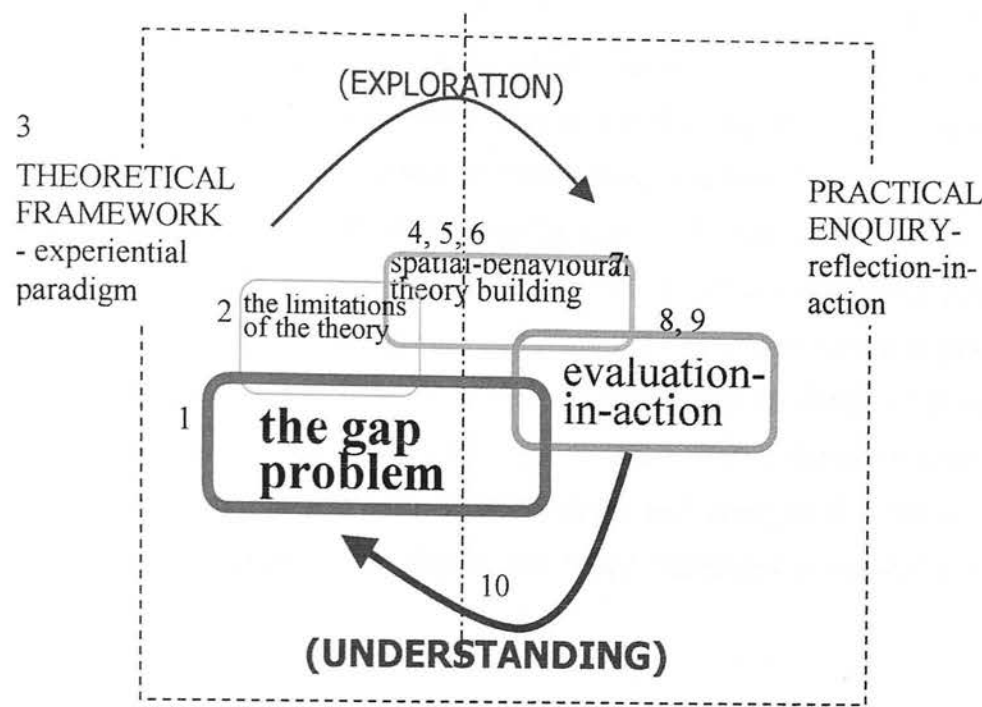


Figure 10.3.i - A diagram representing the ‘understanding and exploration’ generated by this thesis: the numbers represent the chapters.

It is notable that the model is built on an assumption that the search for spatial form is the main imperative of the designer, and at the same time, because of a scientific bias, the researcher is oriented towards integrating and generating knowledge that precludes subjective, place specific and contextual ‘information’. This was the starting point of the thesis, and is therefore the starting point of the model.

The spatial-behaviour **theory building** which took place over chapters 4, 5, and 6, and the techniques and methods for introducing **evaluation-in-action** in chapters 7, 8 and 9, together address the second main problem area relating to the lack of relevant and usable knowledge provided by environment-behaviour researchers for designers.

The research addressed three aspects of ‘the problem’. A) a lack of theory building towards reconciling social and aesthetic perspectives; B) a lack of relevant and usable knowledge provided by environment-behaviour researchers for designers; and C) the general lack of communication and understanding between research and design.

- A) Lack of design framework/a lack of theory building towards reconciling social and aesthetic perspectives.

The problem statement highlighted the existence of a problematic situation that needed to be 'converted' into a problem. However, there was no established context within which to frame the problem to begin with. Throughout the chapters in part one of the thesis, the problem became reframed in a landscape design context. A critique of design theory took place, its limitations identified, and the experiential paradigm highlighted as the most useful framework for analysis. Here, some theory development took place in the positivist approach for explaining and predicting the human *experience* of place in the *landscape* setting. Generic 'static' models of place and a set of 'dynamic' tools and techniques for analysing the landscape experience *with wayfinding design in mind*, and a set of compatible spatial and behavioural theories and conceptual bridges, were identified for their practical utility during site based integrated spatial-behavioural analysis.

- B) The relevance and utility of environment-behaviour **theory** and its research **methods** to the spatial agenda of landscape design.

Part two of the thesis (the practical enquiry) explored the practical application of integrated spatial-behaviour analysis as a 'tool' for introducing user needs evaluation into the design process *whilst it is going on*.

The interpretive/reflective approach became useful in generating knowledge to 'improve', rather than 'prove', the theoretical basis of the integrated spatial-behaviour approach. Through its theory building, the research built on existing knowledge, shaping, generating, elaborating and integrating as necessary, to conceptualise a 'new kind of knowing'. Such investigations are contextualised by the physical setting, and situated in the landscape design process, from where the theory is generated.

Plate 10 illustrates a unifying conceptual 'thinking machine' for theory building. It is based on Zeisel's original conceptualisation of the design process using the spiral metaphor, embodying Girot's four stage-sequence model, with an emphasis on the 'test/re-test' phase for its role in 'evaluation-in-action'. This phase is emphasised as a critical area for bridging research and design - in theory and in practice.

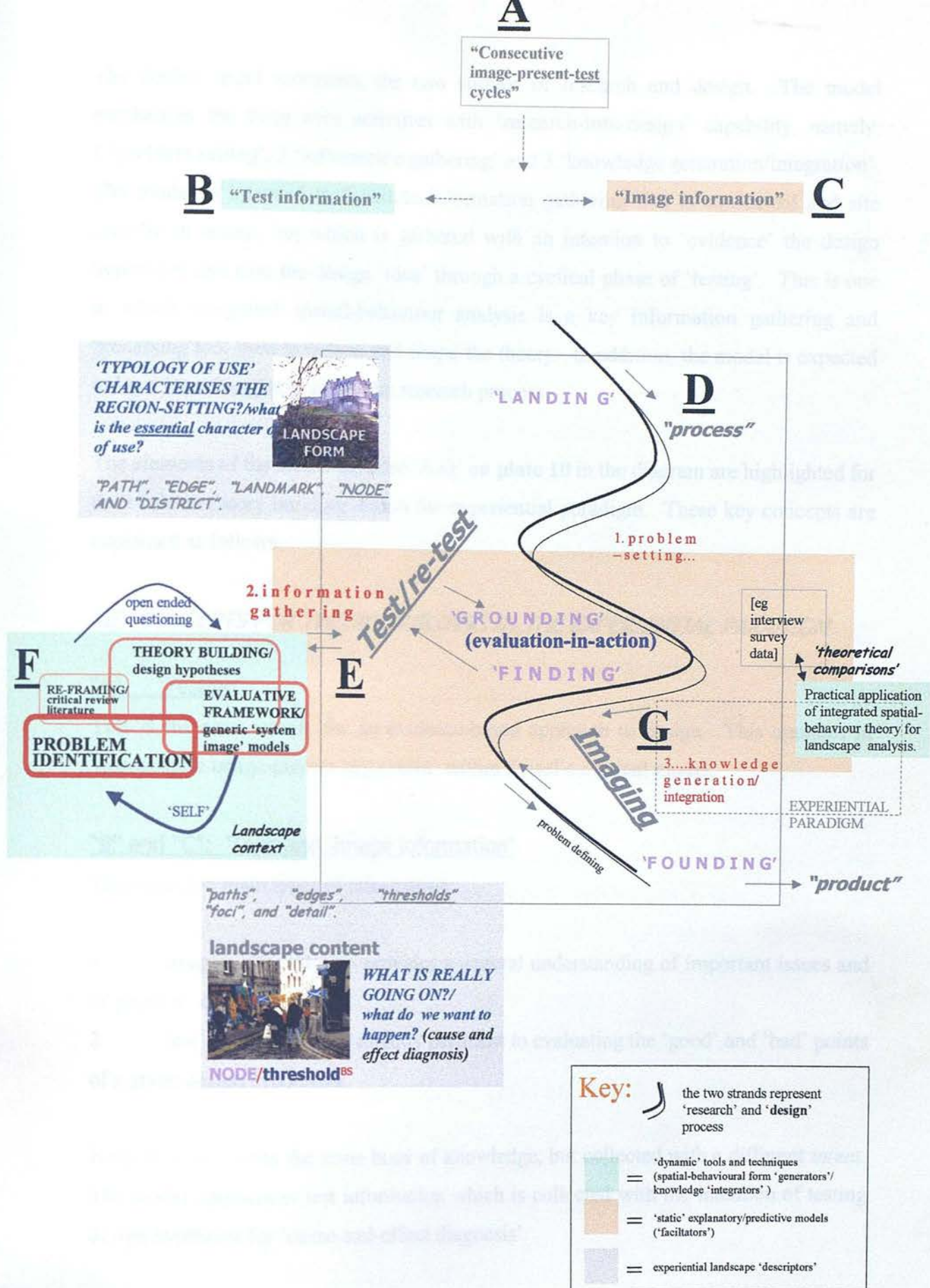


Plate 10: A conceptual 'thinking machine' for theory building.

The double spiral represents the two strands of research and design. The model emphasises the three core activities with ‘research-into-design’ capability, namely: 1. ‘problem setting’, 2. ‘information gathering’ and 3. ‘knowledge generation/integration’. The model is intended to facilitate information gathering that is contextual and site specific in nature, but which is gathered with an intention to ‘evidence’ the design hypothesis and pass the design ‘idea’ through a cyclical phase of ‘testing’. This is one in which integrated spatial-behaviour analysis is a key information gathering and processing tool used to *inform* and *shape* the theory. In addition, the model is expected to have interchangeable use in the research process.

The elements of the model labelled ‘A-G’ on plate 10 in the diagram are highlighted for their role in theory building within the experiential paradigm. These key concepts are explained as follows.

KEY CONCEPTS FOR THEORY BUILDING IN THE EXPERIENTIAL PARADIGM

“A” ‘Testing’

This is the core activity for an evidence-based approach to design. This operates in ‘consecutive image-present-test cycles’ within Zeisel’s original model.

“B” and “C”: ‘Test’ and ‘Image information’

There are two main types of information:

- 1 ‘image’ information – provides a general understanding of important issues and of physical ideas;
- 2 ‘test’ information – is directly pertinent to evaluating the ‘good’ and ‘bad’ points of a given design hypothesis.

Both are drawn from the same body of knowledge, but collected with a different *intent*. The model emphasises test information which is collected with the intention of testing design hypotheses for ‘cause-and-effect diagnosis’.

“D” interpretive/reflective framework

Girod’s conceptualisation of the design process in terms of landing/grounding/finding/founding provides a basic framework structure, which is an

expression of its reflective/interpretive function. The aim is to raise consciousness of the active search for, and receiving of, information for knowledge integration/generation purposes. When put into action it is intended to force one to explain each research or design activity in terms of a method or procedure.

"E" Test-retest phase

This phase is structured by 'grounding' and 'finding' in which site based information is gathered and processed in cyclical action. Landscape models help generate system image models of the landscape experience, ('what is really going on') *and* structure the design image, (ie 'what we want to happen'). Knowledge 'integrators', for example, a 'theoretical comparisons', 'sequence diagramming', 'behavioural indicators', and so on, help in the process. Lynch and Dee models have a key part to play in the process as 'descriptors' of spatial form and content. The ongoing questioning process helps direct the process, and 'facets' of experience help 'narrow the scope' of observation, for example, the designer/researcher might ask 'what factors help or hinder the wayfinding task when <finding entrance>?'). It is here therefore that designer/researcher as 'self' must produce a site specific system image of place, drawing on the knowledge base of, eg wayfinding theory, to construct such models of experience.

As more information is gathered a cause-and-effect diagnosis becomes possible, helping to define the problem and identify appropriate design solution types: models such as the Kaplans understanding-and-exploration help identify, and explain, problems and *at the same time* help predict behavioural effects of potential design solutions. Such models facilitate 'evaluation-in-action' because they are both explanatory and predictive.

"F" Structuring Evaluation-in-action for generating evaluative frameworks

'Structural' questioning is a vital aspect. A set of background evaluative questions are suggested, for use in the *research* process throughout a study to ensure that final research outcomes have design relevancy together with those for use during the *design* process. In both instances the questions arise in a certain sequence, but they should be returned to in cycles of thinking. They have a role in reconciling research and design thinking '-in action'.

Key questions

The following are highlighted for facilitating ongoing reflection in the theory building process – whether this occurs in design, or research oriented studies, for reconciling the ‘thinking’ and ‘doing’ process:

Core activity /reconciling role:	Key question:
PROBLEM ANALYSIS: Problem Setting	does problem analysis identify a ‘situated’ problem?
INFORMATION GATHERING: Information gathering in research and design are two different activities	<p>a) Is information gathering helping to explain the nature of the identified problem in both general and specific terms: is the research generating information that can be used to both structure a generic ‘system image’ model of a type of landscape experience, and <i>at the same time</i> produce site specific information that might, eg, contextualise an interview survey?</p> <p>b) Is the research generating information that will produce <i>research findings/research product</i> (in accordance with the requirements of the research brief),</p>
KNOWLEDGE GENERATION: Lack of integration of behavioural science theory with design	<p>a) the data sets: are environment-behavioural phenomena identifiable as integral spatial/behavioural units and can they be described (verbally) and mapped (visually in 2-d/3-d/4-d)?</p> <p>b) the emerging the model of landscape experience: is it ‘acceptable’ in accordance with established definitions of ‘theory’, ie</p> <p>i Can the model <i>explain</i> all the observations?</p> <p>ii Can the model be used to <i>predict</i> the ‘behaviour of the system’ if it is applied in a specific way?</p> <p>iii Is the model <i>consistent</i> with other ideas about how the world works?</p>

“G” Imaging

‘Imaging’, using the visual-spatial approach to spatial-behaviour analysis, is a key process for the test/re-test process for it is the ability to go beyond the information given, seeing something where nothing seems to have been before. It was described by Zeisel as an internal process of forming a mental image that becomes externalised

through 'presenting', and occurs throughout the entire design process in consecutive cycles of 'image-present-test'. It is notable that the thesis implicitly explored the role of communication by embodying a visual approach to theory development and explanation.

Knowledge generation/integration using imaging helps in the ongoing and inter-linked process of defining 'the problem' and identifying, and refining, appropriate solution types. It is here that theory building has taken place in the current thesis and where researcher/designers have much to contribute through positive theory building, to produce generic spatial models of the landscape experience which are useful, and usable, by landscape designers for adaptation to the site specific situation.

Towards achieving 'a new kind of knowing', the lack of communication and understanding between research and design must be addressed.

C) Lack of communication and understanding

This thesis has found conceptual (image) models extremely useful in aiding the thinking process. It was Geddes who originally stated that new knowledge could not be gained without new methods. Similarly, this thesis has placed value on the use of conceptual models as 'thinking machines', or in other words, paths to new knowledge. These were presented throughout the thesis to help in the problem setting process but also to facilitate and structure information gathering. Such models are useful in one's own thinking process, but they also serve as communication tools.

The 'double spiral' model provides the basic conceptual structure (or 'primitive sketch') which designers could use to help structure their own design process for 'evaluation-in-action', (and thus introduce 'research' into design) but equally, its application in the research process can embody design thinking for the purposes of orientating information gathering towards a design-relevant outcome. The model might therefore be considered a 'map'. It is deliberately skeletal and conceptual to fit with design thinking which, according to the literature, rejects the use of prescriptive methodology. It is intended to help facilitate a reflective/interpretive mode of 'thinking' and 'doing', for theory generation *with the landscape design process in mind*. The model is highly adaptable to take into account the unique set of conditions that each individual site survey presents.

10.4 CONCLUSION

This thesis might be thought of in terms of a spatial metaphor. It could be considered a transitional space arising out of ‘the problem’ and leading towards ‘the solution’. The conceptual bridging that the thesis undertook has generated theory that enables the problem to be brought into perception. The boundaries of the problem could only come into existence by exploring, and become aware of, its different dimensions. In other words, the problem became defined in the act of exploring it, in the same way that Norberg-Schulz and Christopher Alexander describe how a transition space defines itself upon the act of ‘entering’ (see figure 10.4).

To ‘see’ the gap problem, is to acknowledge its existence, but one must first become conscious of it. To raise design awareness of the gap problem must therefore be the main challenge for future research endeavours in this area.

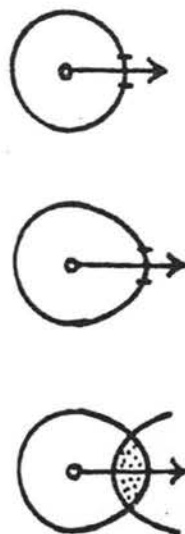


Figure 10.4 - The transition space defining itself upon the act of entering. (NORBERG-SCHULZ, 1971, p25)

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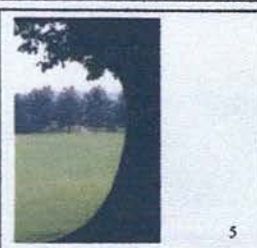


APPENDIX A

example of 'composite'
interview/visual-spatial data-
sets




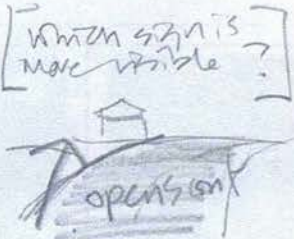

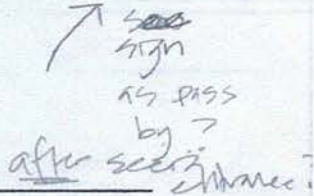



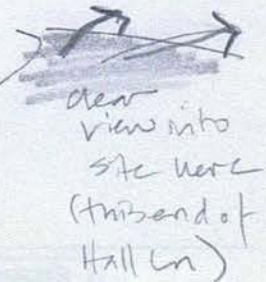
A.1 – The decision to go to <Pages Wood– the bridge entry point>: “how did you find out about this site?”

A.2 – The decision to go to <Pages Wood– the Hall Lane car park>: “how did you find out about this site?”





A.3 – Finding entrance to <Afan Argoed>: “what prompted you to turn off at the entrance?”

vis code	Travel mode	find out	arrival route scenario	environmental prompt
tc09	car	Saw it being built other people/activity attracts other people/activity	<route 3> + <route c>	 9 a popular place to sit busy part of park PLAYGROUND
tc07	walk	Always been using HH park - saw them doing work here.	<route c>	 11 clear view into site
tc10	walk	Watched new bridge being built	<route c>	 12
tc18	walk	Saw it being built while watching football in park last year	<route c>	 5 clear view across sports field
tc06	walk	Father brought her here first time. / Saw path and walked in.	<route c>	 14 easy in / easy out
tc17	cycle	Didn't know it existed - even though I walk dog in HW Park. / Saw bridge today and came across.	<route c>	 16 can hover in/out transition of space



A.1 – The decision to go to <Pages Wood– the bridge entry point>: “how did you find out about this site?”

The decision to go to < PAGES WOOD>: - Identifying environmental 'pull factors' prompting a visit.				environmental prompt	
vis code	Travel mode	find out	arrival route scenario		
tc22	car	Word of mouth, saw site progressing	<route 1>		
tc24	car	word of mouth. Saw entrance sign when passing the previous week	<route 1>		
tc04	car	Drove past - saw sign and thought would give it a try.	<route 1>		
tc05	car	Drove past, saw Hall Lane Entrance	<route 1>		
tc15	walk	Drive past everyday, saw trees being planted	<route 2>		



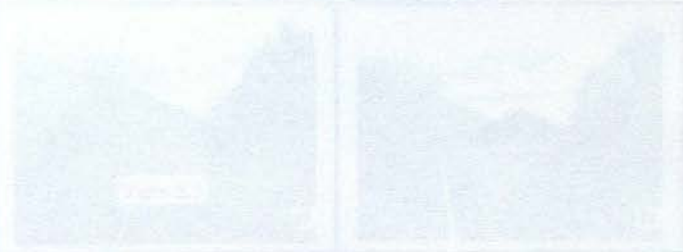
A.2 – The decision to go to <Pages Wood– the Hall Lane car park>: “how did you find out about this site?”

vis code	Travel mode	first visit?	visit purpose	arrival route scenario	turnoff prompt	
aa08	car	no	Cycle	< from south>	Bicycle sign on road	
aa01	car	no	Family walk	< from south>	Just knew it. Problems at the entrance because of the speed cars go up there.	
aa02	car	yes	Family history	< from south>	The signs - being inquisitive to know what's there - being a Welshman.	
aa03	car	no	Cycle	< from south>	About 1 mile down 'Afan Forest'-doesn't say anything. Then found 'Tymaen' drove in and saw other cars turn in and drive away - wrong site. Easy to find 2nd time. Turn-off could cause an accident - not enough advance warning from Pontryhydyfen.	
aa24	car	no	Walk dog	< from south>	Parking sign	




A.3 – Finding entrance to <Afan Argoed>: “what prompted you to turn off at the entrance?”

aa25	car	no	Family walk	< from south>	Always look for the sign	
aa26	car	yes	Cycle	< from south>	 <p>→</p> <p>Thought I had gone past it, turned in here simply to do a u-turn, then realised was the right place, saw sign for something:</p>	
aa27	car	yes	Cycle	< from south>	Saw sign	
aa04	car	yes	Cycle	< from south>	More at entrance, not marked, saw sign as drove past, turned around and came in - saw sign for another parking spot 100m, thought it was that place.	[see below]

A.3 – Finding entrance to <Afan Argoed>: “what prompted you to turn off at the entrance?”

vis code	Travel mode	first visit?	visit purpose	arrival route scenario	turn-off prompt	
aa05	car	no	Cycle	< from south>	Signs	
aa07	car	yes	Cycle	< from south>		
aa11	car	no	Cycle	< from south>	Main sign, however first time I turned off at Tymaen	
aa23	walk	no	Run	< from south>	At Afan Argoed, an awkward corner, I think it's signposted, on your right going up, it's quite covered really I think you'd have to keep your eyes open. It needs to be signed a bit more perhaps. I think there's quite a few signs coming up the road.	
aa06	car	no	Mining museum	< from south>	A sign at the entrance	
aa22	car	no	Run	< from south>	Knew what to look for - it's not the sort of place you stumble upon - so you have to have prior notice in the village. Parked at Pontryhydyfen (village) not in FC car park as problems with cars being vandalised	

A.3 – Finding entrance to <Afan Argoed>: “what prompted you to turn off at the entrance?”

vis code	Travel mode	first visit?	visit purpose	arrival route scenario	turnoff prompt	
aa09	car	yes	Cycle	< from south>	Small parking sign 300m before turning, then entry sign	
aa10	car	yes	Falconry display	< from south>	entrance sign	
aa13	car	yes	Wildlife	< from south>	Sign at entrance	
aa14	car	no	Wildlife	< from south>	Entrance sign, but I know where it is	
aa15	car	no	Cycle	< from south>	I was looking for the sign and turned right at the sign	
aa16	car	no	Family walk	< from south>	Turned onto the site when I saw the sign. However we turned into the 1st car park.	
aa17	car	yes	Cycle	< from south>	The signpost at the entrance	
aa18	car	no	Cycle	< from south>	Sign for the site	
aa19	cycle	no	Family walk	< from south>	Yes, you are on it [the turn off] before you know it, need more notice. Can easily pass it on bend and need to come back, obvious you have missed it.	 

A.3 – Finding entrance to <Afan Argoed>: “what prompted you to turn off at the entrance?”